ELECTRICAL WEST

August 1949
25 cents

Good Industrial Relations, Page 55
Appliances, Page 78

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

top of the ba

Now—when baseball is with us—seems like a good time to draw a parallel between baseball and the appliance selling business. They're similar, really: the difference is that you mark results in sales instead of runs.

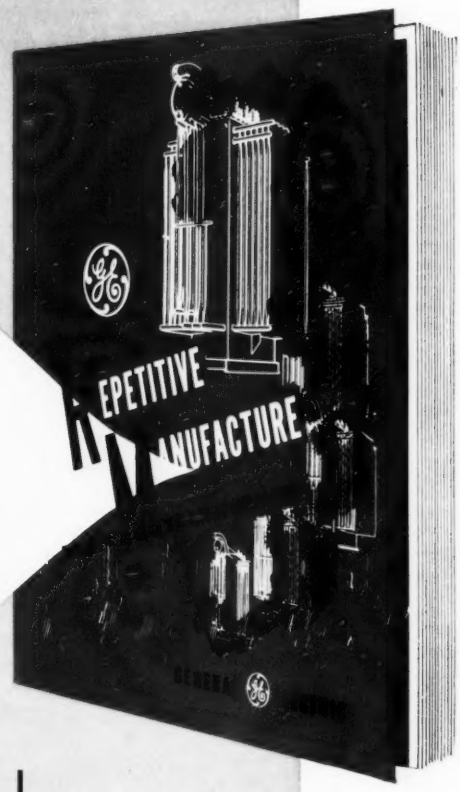
Good managers don't depend on solo efforts. They set a definite scoring pattern in the lineup: the first batter to "get on," the second to advance him, and the third to drive the score across home plate. That's the kind of teamwork that pays off in either field.

For more than fifty years, Edison has been hitting consistently. After the manufacturer leads off, Edison advertising does its best to advance appliances to scoring position. It helps the dealer boost his average of "runs batted in!"

Edison

SOUTHERN CALIFORNIA EDISON COMPANY

HERE ARE ALL THE FACTS ON RM* POWER TRANSFORMERS



*Certain G-E power transformers, within the complete G-E line, have for a number of years been designated as "repetitive manufacture," or "RM" for short. These are standard transformers that lend themselves to quantity production.

Through quantity production RM transformers can be built faster, at lower cost. Engineering and drafting for any particular transformer is already done—component parts can be mass-produced—jigs and fixtures are already on hand.

As a result, RM transformers can be delivered months sooner than non-RM transformers. Their prices are lower, by at least eight per cent, than specials of identical ratings.

"RM" transformers are available in ratings of 667 to 5000 kva, single-phase, and 750 to 10,000 kva, three-phase and with high voltages in accordance with EEI-NEMA preferred voltage ratings between 2400 and 67,000 volts. They are equipped with the most popular types of terminals and accessories.

A NEW 44 page catalog gives you

Prices • Ratings

Electrical and mechanical data

Application and selection data

Lists and descriptions of basic accessories and optional features

If you haven't received your copy of GEC-479, call your local G-E office or write *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

GENERAL ELECTRIC

401-7

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

AUGUST 1949

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-second year of publication

ELECTRICAL WEST

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NEXT MONTH

September is our special lighting issue. Special features this year will include: Denver's remarkable school relighting program in which every school has been completely relighted: Victor Gruen's graphic presentation for flexible ceilings in merchandising establishments; office lighting and glare treated from an advisory angle, by C. W. Macy, and the value of manufacturer's lighting test data, by James McCullock.

In addition there will be several pictorial pages of recent outstanding lighting installations in the West.

Results of a Utah heat pump test installation will be reported. There will be Market Week and San Diego conference reports.

A feature of the engineering section will be a picture story on Southern California Edison Co.'s multi-million dollar electrical modernization program at its Big Creek hydro plants. There will be an article on a new quick-break load interrupter switch: a progress report on research into the therapeutic value of a high-temperature electrical heat source to create positive ions for alleviating such ailments as sinus trouble: data sheets and other regular features. Then—"All God's Chillen Got Troubles"—an appliance agony in "blackout."

Sales Guide, Sales Guide News Letter, news of the industry and association news will round out the issue.

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COVER PICTURE: Alhambra High School cooking department, Southern California Edison Co. photo.

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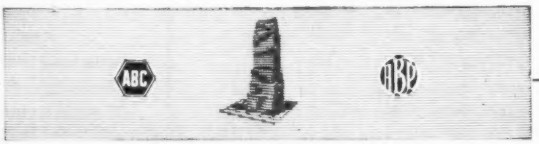

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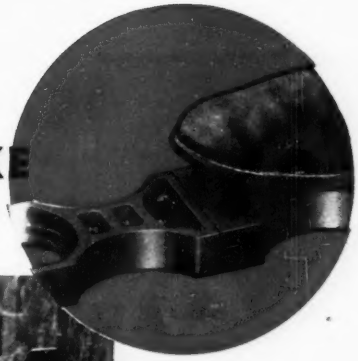
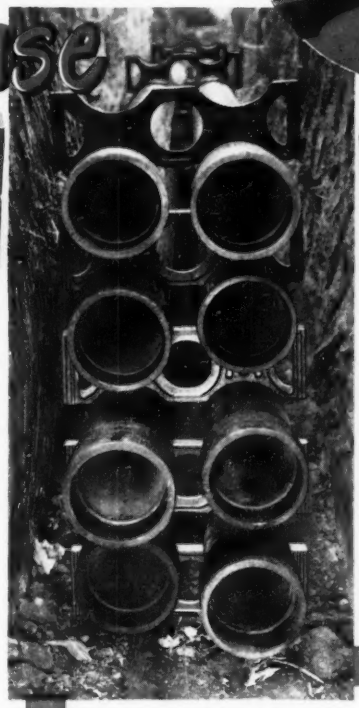
new L-M SPACERS AND L-M EQUIPMENT MAKE L-M FIBRE CONDUIT easier to use





The new L-M Clevelon two-way Spacer assures faster installations with precise, even spacing of the conduit. L-M Spacers are light, durable, strong. They withstand a vertical flat crushing test of over 1200 pounds. Ends are grooved, so that they lock together for joining into multiples; centers are notched for sawing, for uneven-numbered combinations. Clevelon is fire-resistant and listed as standard by Underwriters' Laboratories, Inc. Spacers come in standardized cartons which save stockroom handling and space. Available from stock, in six standard sizes.

L-M FIBRE CONDUIT WITH L-M SPACERS

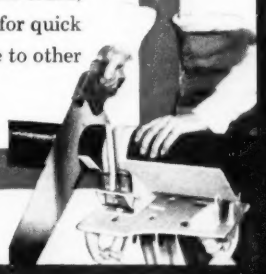
L-M Fibre Conduit is tough, strong, resistant to acids and alkalis, heat and cold. Smooth inside finish has low resistance to cable pulling, without abrasion. Complete line of couplings, adapters, reducers, elbows, and bends.

NEW L-M TAPER-TOOL

Cuts a precise 2° taper to assure tight, snug joints. Light; easy to use; salvages cut ends and short lengths.

NEW L-M FIBRE CONDUIT VISE

Holds all sizes of conduit firmly for cutting or tapering. Use it in the shop, on the truck, or at the job. Three detachable legs for quick field set-up. Tripod stand adjustable to other types of vises.



GET THIS L-M HANDBOOK OF UNDERGROUND CONSTRUCTION MATERIALS

Ask the L-M Field Engineer for the 80-page booklet UG 1, or write Line Material Company, Milwaukee 1, Wisconsin.

LINE MATERIAL Fibre Conduit

7133

Complete Coordinated Equipment for All Distribution Requirements

CERTIFIED STARTERS GIVE YOU A "Good Break!"

You get a "Good Break" two ways when you insist on Certified Starters for your fluorescent fixtures

1 You get a positive "break" when the tiny bimetal contacts within a Certified Starter break open to provide the needed voltage to start a fluorescent tube.

2 Certified Starters assure good lighting performance—full starter life—long lamp life—and lower maintenance costs.

"Certified" on a starter means it was made to precise specifications, then tested and checked by impartial Electrical Testing Laboratories, Inc.

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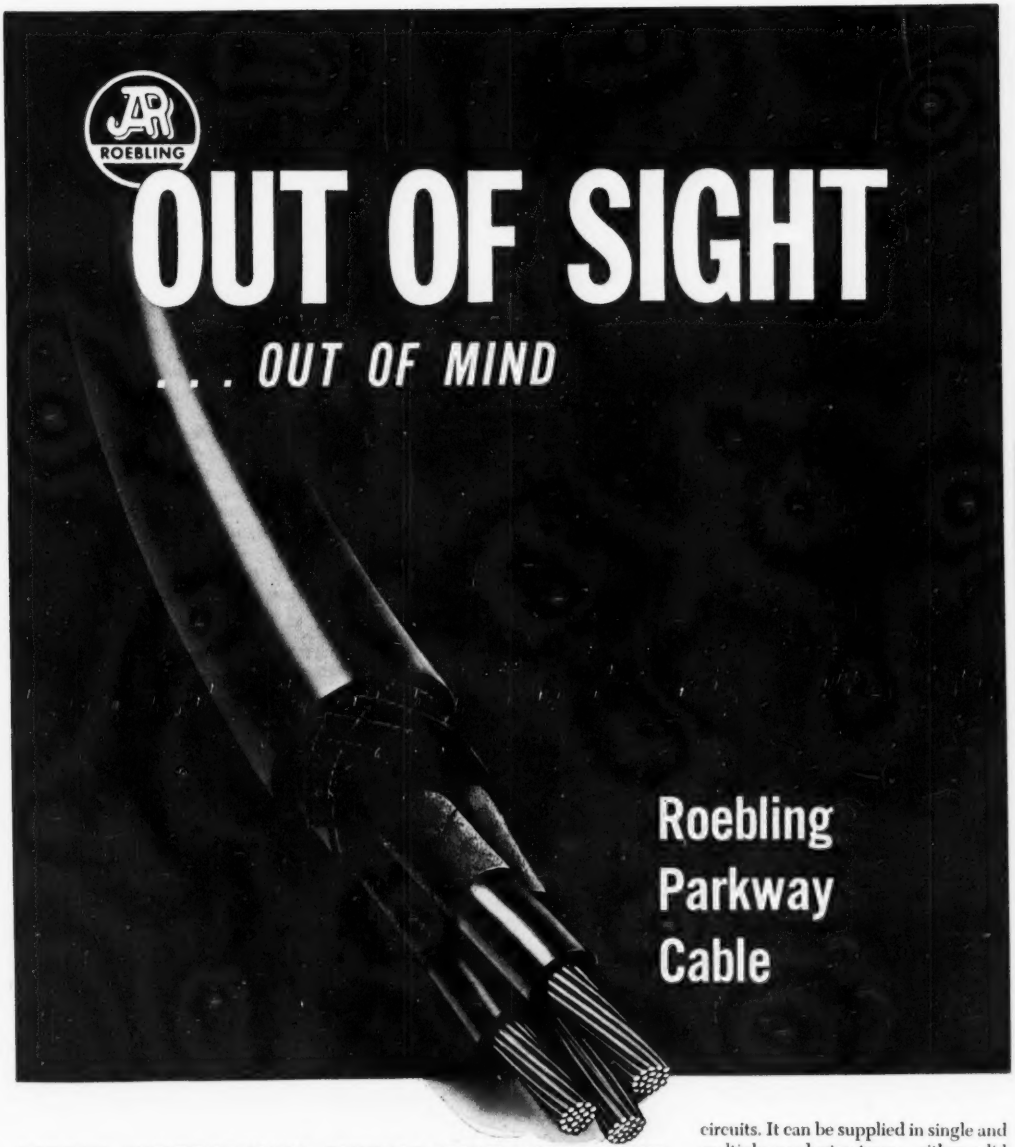
Say "Certified Starters" and get a Good Break

Certified Fluorescent Starter Manufacturers

2116 KEITH BUILDING • CLEVELAND 15, OHIO



DIRECT UNDERGROUND INSTALLATION CUTS COSTS

YOU AVOID ALL THE EXPENSE of underground duct systems with Roebling Parkway Cable. It's laid directly in an economical two- or three-foot trench. And as soon as it's out of sight, your problems are over. Wind and weather can't bring service troubles . . . metallic armor or a Roeprene sheath assures safe physical protection.

Roebling Parkway Cable is being widely adopted for series street lighting, parkway boulevard lighting, traffic signal, fire alarm, flood lighting, railroad yard, signal and other types of circuits. It can be supplied in single and multiple conductor types—either solid or stranded—in a range from 600 to 5000 volts.

Have your Roebling distributor or Roebling branch office help select the best cable for your special needs. John A. Roebling's Sons Company of California—San Francisco—Los Angeles—Seattle—Portland.

WRITE OR CALL THE ROEBLING FIELD MAN AT YOUR NEAREST ROEBLING OFFICE AND WAREHOUSE

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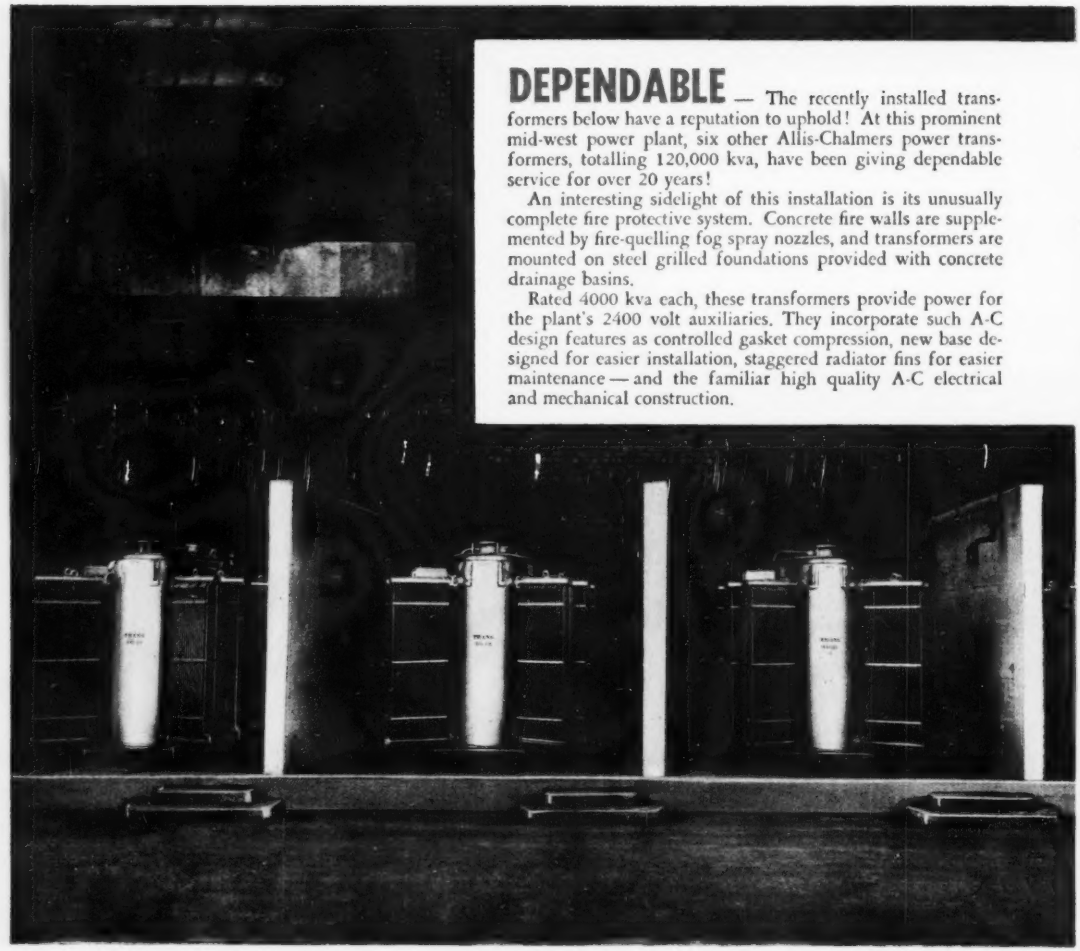
ROEBLING

☆ *A CENTURY OF CONFIDENCE* ☆

ALLIS-CHALMERS Dependable Because



DEPENDABLE — The recently installed transformers below have a reputation to uphold! At this prominent mid-west power plant, six other Allis-Chalmers power transformers, totalling 120,000 kva, have been giving dependable service for over 20 years!

An interesting sidelight of this installation is its unusually complete fire protective system. Concrete fire walls are supplemented by fire-quelling fog spray nozzles, and transformers are mounted on steel grilled foundations provided with concrete drainage basins.

Rated 4000 kva each, these transformers provide power for the plant's 2400 volt auxiliaries. They incorporate such A-C design features as controlled gasket compression, new base designed for easier installation, staggered radiator fins for easier maintenance — and the familiar high quality A-C electrical and mechanical construction.

A-C

...means Quality Power Transformers

Circular coils withstand high stresses. Coils are rigidly braced, vacuum dried and treated.

"Capacity Tailored" Load Ratio Control, featuring Allis-Chalmers 32-step regulation.

Controlled gasket compression insures correct pressure . . . increases life, effectiveness.

Strong, fin-type radiators rigidly braced. Staggered construction simplifies repainting.

Proved Oil-Sealed Inert Gas Protection provides simple, positive oil preservation.

Power Transformers.. They're Quality-Built!

QUALITY-BUILT — Shown under construction at right is one of the largest transformers ever built. A special low body transformer car was needed to meet railroad clearances during shipment to its Midwestern installation site.

Size of the transformer favored side mounting of the *Oil-Sealed* inert gas protective system . . . serving the double purpose of bringing gauges into easier reading position and increasing overhead line clearances.

* * *

Whether it's a bank of auxiliary transformers, or one of the world's largest, Allis-Chalmers facilities for building power transformers *of any rating* are second to none. For the factual story of how Allis-Chalmers builds quality into power transformers, write direct for bulletin B6402. A-2775

ALLIS-CHALMERS, 939A SO. 70 ST.
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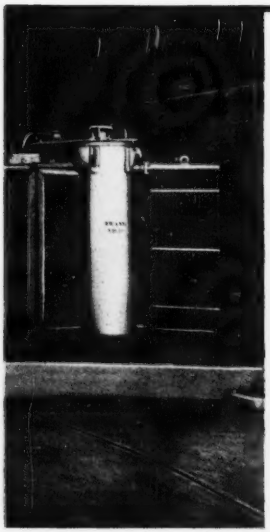
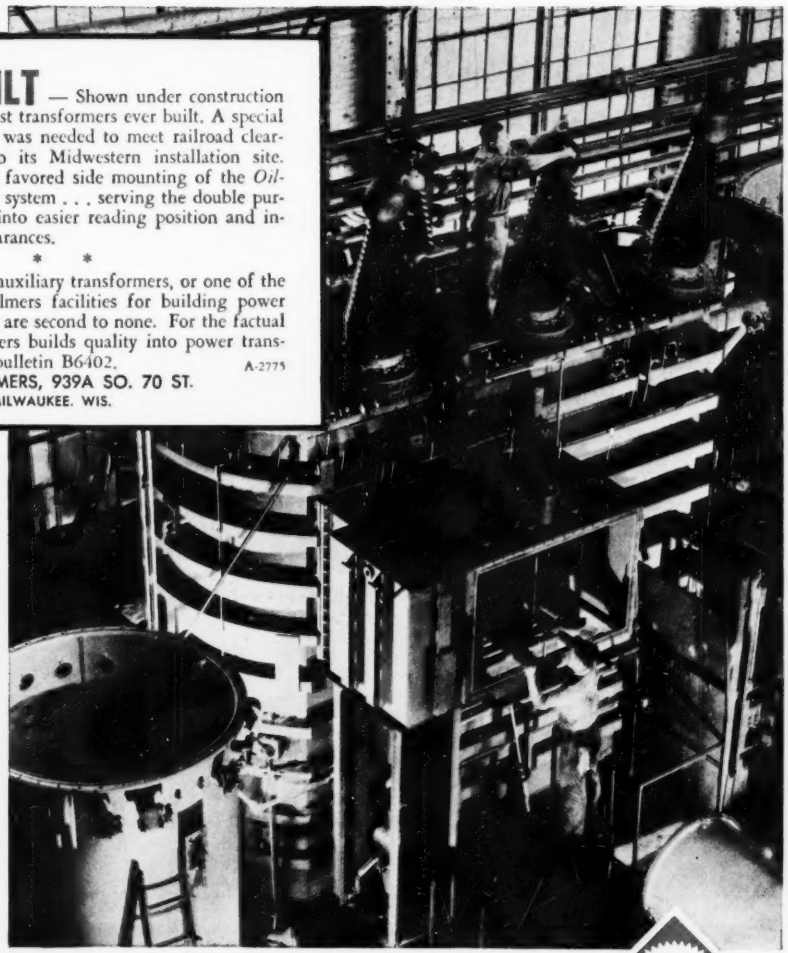




ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment From Generation Through Utilization

Nicopress

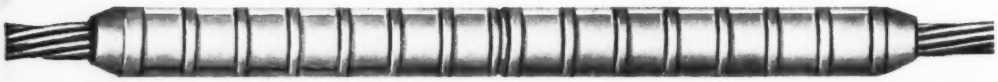
SPLICING SLEEVES

FOR LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS

**Light in weight—Holds full strength of conductor—
High in conductivity**

Completed NICOPRESS Splice on 4/0 Copper Conductor

**Completed NICOPRESS Splice on 3/8″ Extra High Strength
Copperweld Strand**



**Completed NICOPRESS Splice on 3/8″ Extra High Strength
Galvanized Steel Strand**

Nicopress is the Registered Trade Mark of The National Telephone Supply Company

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The National Telephone Supply Company

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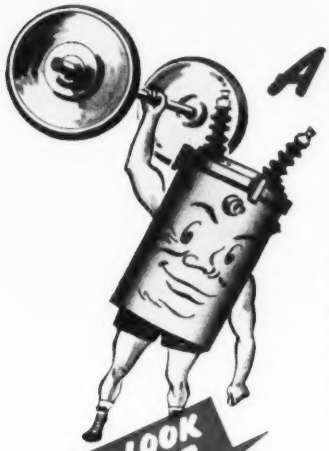
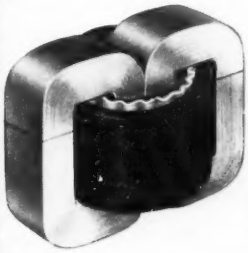


A smaller package for a BIGGER Job!

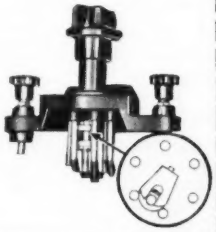
They say good things come in small packages. In the case of Moloney HiperCore Transformers, it's true! Though much smaller in size and lighter in weight, HiperCore Transformers have greater short-time overload capacity, better voltage regulation and are much more dependable for all-around sustained performance. Averaging ⅓ smaller in size and weight, HiperCore Transformers have improved characteristics, which will be reflected in your maintenance and operating records.

HiperCore Transformer cores are wound from oriented, silicon steel. Each loop is annealed in its final form and individual laminations do not have to be disturbed for assembly, assuring top performance of unstressed core steel. Annealed core loop is impregnated with high temperature plastic binder which makes possible cutting into two U-shaped pieces. Cutting burrs are neatly removed by etching.

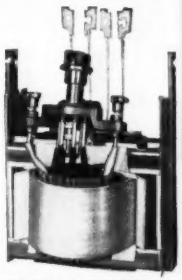


The core-and-coil unit is a center-leg type of construction, having a single coil and two core loops. Each core loop is cut into two U-shaped pieces after impregnation, and then cemented back together when the coil is in place. Steel bands around each core loop hold the two U-shaped pieces tightly together with a force of from one to three tons.

The Moloney HiperCore Tap Changer is unmatched in ruggedness and design. The plainly numbered operating handle is located *above* the hot oil level. Double-wedged contacts snap into place with a wiping action. Sturdy beryllium copper springs provide high pressure contact.



The complete core-and-coil unit for a HiperCore Transformer is the last word in compact design and superior performance. Simplicity of design plus liberal use of materials and adequate cooling ducts combine to make HiperCore Transformers cooler operating and better performing, resulting in longer life under normal operating conditions.



Plus FEATURES

- ✓ Lower Hottest-spot-over-oil temperature
- ✓ Longer Operating Life
- ✓ High Factor-of-Safety in Design
- ✓ Lighter Weight
- ✓ Smaller Size
- ✓ Greater Short-Time Overload Capacity
- ✓ Better Voltage Regulation
- ✓ Superior Tap Changer

Send for Bulletin H-303 discribing HiperCore Transformers.

MOLONEY

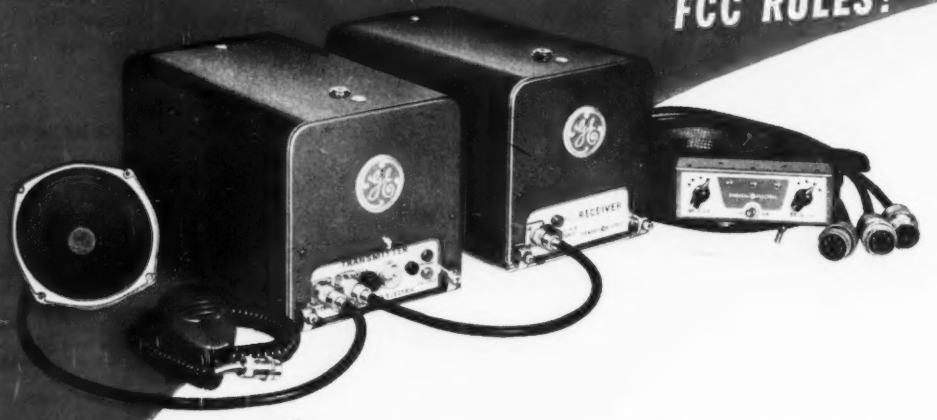
ELECTRIC COMPANY

Sales Offices in all Principal Cities

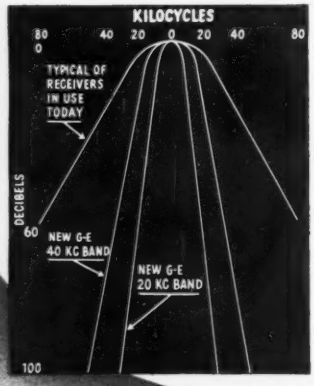
FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONTARIO, CANADA

Announcing

A 2-WAY RADIO THAT MEETS OR EXCEEDS ALL NEW FCC RULES!



New 25-50 MC EQUIPMENT FOR 20 KC OR 40 KC CHANNELS



HERE'S WHY IT'S SO GOOD! ● Permits double the number of usable channels in the same spectrum space. With it you can take advantage of a national allocation plan, set up on 20 kc channels, to reduce skip interference ● Extends your communication range. Weak signals come through "loud n' clear" because of the famous G-E wide-crown receiver response curve ● Includes instantaneous modulation control, which automatically compensates for loud or soft, high or low pitched voices. Holds transmission inside assigned channel—thus meeting FCC requirements well in advance of the deadline.

FCC and INDUSTRY ASKED FOR IT—HERE IT IS!

The FCC Order of May 6, 1949 emphasized the need for equipment that would operate on closer spacing than 40 kc. The new G-E equipment shown here meets this need NOW. In chart at left note how closely the G-E curve approaches the ideal flat-top, straight-side response. In recent tests, G-E 20 kc equipment completely eliminated off-channel skip interference: skip signals did not even open the receiver squelch.

You can put your confidence in—

GENERAL ELECTRIC

TEST IT IN YOUR PRESENT SYSTEM WITH OUR GENEROUS

Trial Offer!

AFTER two years of intensive engineering and rigorous performance tests, these new G-E units are now in full production and are ready to take on the toughest communication jobs you can give them! They are performance-engineered at Electronics Park* to withstand extremes of heat and cold as well as the severe vibration of mobile service—built to give you the clear, sharp reception you've been waiting for!

Here's an opportunity to test this new G-E equipment—an opportunity you can't afford to miss!

TO PRESENT USERS OF 30-44 MC EQUIPMENT OF ANY MAKE!

The most important single item in your entire radio communication system is the base station receiver. Step up the performance of your present 30-44 MC system by installing one of the new G-E receivers in your central station. You'll notice the difference immediately throughout your entire net. Off-channel interference will be reduced almost to the vanishing point, your signals will come through louder, clearer than ever before. And...

If the new G-E unit doesn't do a better job for you than any equipment you've ever used, General Electric will take it back at no cost to you!

*World center of electronics progress—General Electric's new "University of Industry" at Syracuse, New York.

Let the Equipment Do the Talking!

Clip and Mail this Coupon Today! (For even faster action, call the radio communication representative at the G-E office nearest you, or wire *General Electric Company, Building 1, Room 239, Electronics Park, Syracuse, New York.*

General Electric Company—Bldg. 1—Room 239A
Electronics Park, Syracuse, New York

I am interested in your Trial Offer. Send me all the facts on the new G-E 25-50 mc equipment and have your representative call on me.

NAME.....

TITLE or COMPANY.....

ADDRESS.....

CITY.....STATE.....

REMARKS.....

.....

"Ad-On" MULTI-BREAKER

TYPE MB-4 SERVICE AND LOAD CENTER

ADD CIRCUITS
Easily, Quickly
At Low Cost

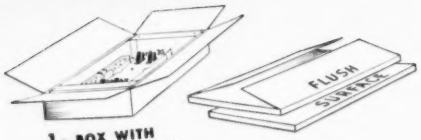
START WITH 4:

Basic circuit breaker unit provides 4 single pole, 1 double pole and 2 single pole, or 2 double pole circuits in combinations of 15, 20, 30, 40 or 50 ampere ratings.

ADD 4 MORE:

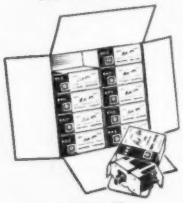
1, 2, 3, or 4 single pole circuit breaker units rated 15, 20 or 30 amperes are easily plugged in on basic block.

FLEXIBLE MERCHANDISING PLAN



1 · BOX WITH BASIC BLOCK

2 · FLUSH OR SURFACE TRIM



3 · "Ad-On" BREAKERS

a Small Stock of **COMPONENT PARTS** covers all job requirements when assembled in various combinations.

Coilless
Thermal Magnetic Multi-breaker

The basic **"Ad-On"** Multi-breaker unit provides four circuits—the *minimum* for a modern home. Even more important, it provides for easy addition of circuits *as they are needed*. Four off-the-shelf **"Ad-On"** breakers extend the range of the basic block in the required circuit pattern.

Architects, builders and contractors all know from experience that many electrical appliances are added after homes have been completed and lived in. With **"Ad-On"** breakers it's a simple matter to provide these circuits so necessary for better electrical living.

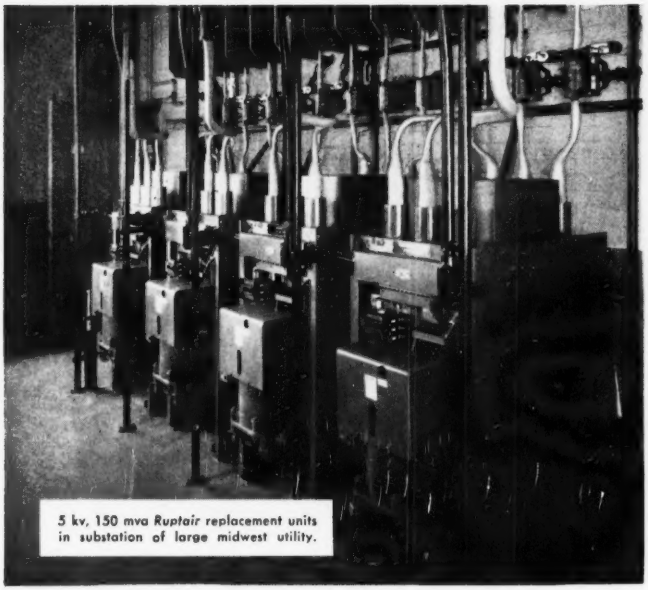
ASK Your Square D Electrical Wholesaler to Show You the "Ad-On"

SQUARE D COMPANY

DETROIT · MILWAUKEE · LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

Introducing...RUPTAIR REPLACEMENT UNITS!

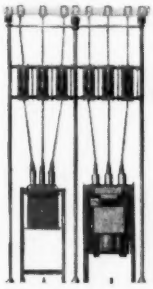


5 kv, 150 mva Ruptair replacement units in substation of large midwest utility.

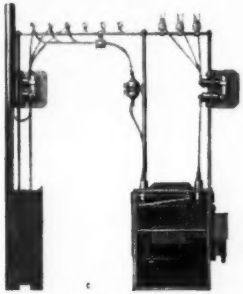
Typical Modernization Application:

You salvage everything but the obsolete breaker when you install *Ruptair* replacement units. New current transformers, disconnect switches, or buses are usually unnecessary.

A.) Typical open type iron pipe framework used with oil type circuit breaker and other switchgear components.



B.) New *Ruptair* unit replaces obsolete circuit breakers without disturbing buses, disconnect switches, instrument transformers.



C.) Side view of installation B.

IMPROVE CIRCUIT PROTECTION
REDUCE MAINTENANCE
MODERNIZE INADEQUATE FACILITIES

NOW YOU CAN REPLACE obsolete, worn out, low capacity oil breakers with *modern Ruptair* circuit breakers. These Vertical-lift Replacement Units are the logical way to get reliable protection with minimum expense, installation time and station modification.

Utilities can increase station interrupting capacity, meet modern power distribution requirements with these new units.

The Vertical-lift *Ruptair* circuit breaker is oilless, reduces fire hazard, requires little maintenance. Attached wheels make possible inspection and maintenance remote from the unit.

Unit is easily installed in existing concrete or masonry cells or in open-type iron pipe framework. Comparative low height makes it applicable to small existing structures. Vertical-lift design simplifies connection of bushings to existing bus or cable at minimum cost.

Voltage ratings 2300 and 4160 volts, interrupting capacities 100, 150, 250 mva. Current capacities 1200 and 2000 amperes, a-c or d-c solenoid operation.

Call your A-C sales office or write direct for new Bulletin 18B7094.

Ruptair is an Allis-Chalmers trademark.

ALLIS-CHALMERS
First in the U. S. with Metal-Clad Switchgear

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

Please send new bulletin 18B7094 on *Ruptair* replacement unit.

Name _____

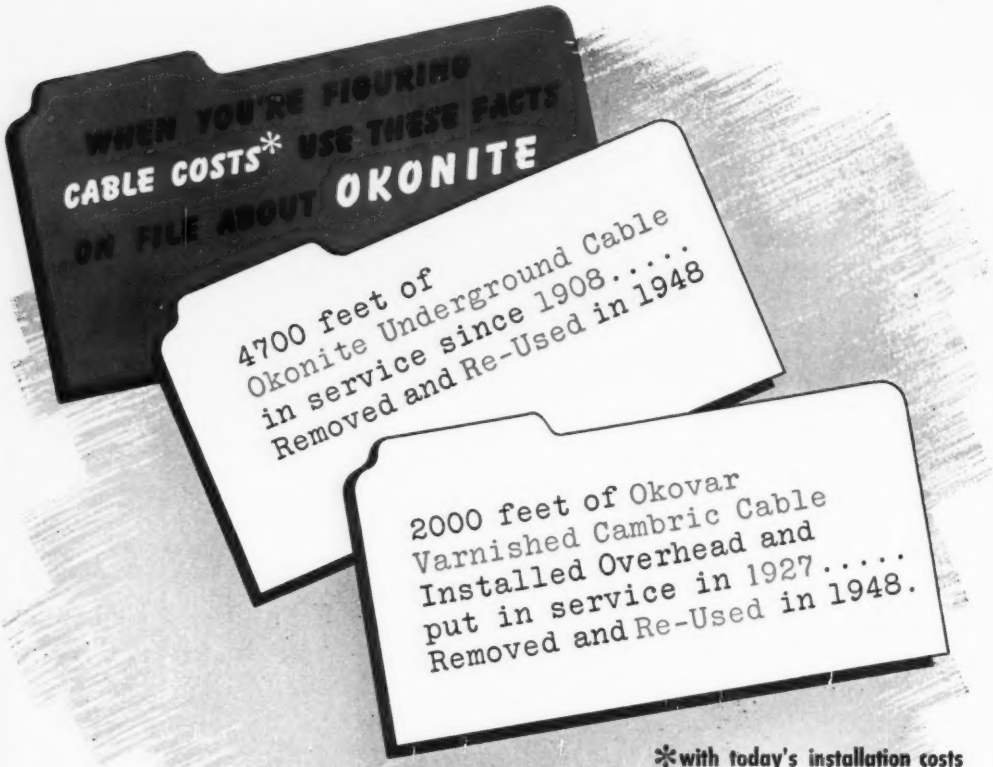
Title _____

Company _____

Address _____

City _____ State _____

A-2747



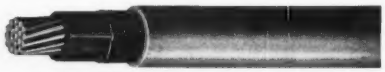
In the files of The Okonite Company are a number of case histories that tell their own story of the long life—the real yardstick of cable economy—that you can count on with Okonite. The two instances cited above are from the records of a single customer.

They are two of eleven instances of cables long used and transferred to new locations by this customer, who has re-installed more than 24 miles of such Okonite cable.

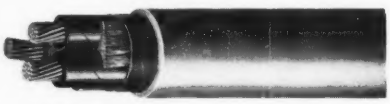
Building true value into cable has been Okonite's business since 1878. What goes into an Okonite cable to make it do a better job...what tests it must pass...what care is taken to control its electrical characteristics—all this and other data are found in Research Bulletin WE-101. For a copy, address The Okonite Company, Passaic, New Jersey.

*with today's installation costs only the *Longest-Lived* will be economical.....

The lifetime cost of a cable rather than its first cost is the only true measure. Okonite wires and cables, built to stand up better and longer, can offset high installation costs.



Okonite rubber insulated lead-covered underground cable.



Okovar varnished cambric lead-covered aërial power cable.

THE BEST CABLE IS YOUR BEST POLICY

7421

OKONITE SINCE 1878 *insulated wires and cables*

Install E. M. T. Faster and Neater with BRIEGEL Thin-Wall Fittings

NEATER • FASTER • STRONGER • APPROVED

All B-M Fittings Carry the Underwriters' Seal of Approval

FOR faster, neater and stronger thin wall conduit connections insist on either Briegel Indenter or Twiston Briegel Self-threading type all steel, one piece connectors and couplings.

B-M Indenter fittings, the only approved couplings and connectors of this type, have long enjoyed wider use and application than any other method of installing E.M.T.

The new B-M Twiston Self-threading fittings now make it possible to have threaded, raintight E.M.T. connections without the use of dies. Two complete turns with a pair of pliers threads the tubing and screws the fittings into a locked position, which results in the strongest connection possible, and one that will withstand severe vibration.

Whatever the thin wall job might be, you will find that you can do it neater, faster and better with Briegel UL Approved E.M.T. fittings.

BRIEGEL METHOD TOOL CO.

GALVA, ILLINOIS

DISTRIBUTED BY

The M. B. Austin Co., Northbrook, Ill. Clifton Conduit Co., Jersey City, N.J. The Steelduct Co., Youngstown, Ohio Nat. Enameling & Mfg. Co., Pittsburgh
Clayton Mark & Co., Evanston, Ill. Gen. Electric Co., Bridgeport, Conn. Enameled Metals, Pittsburgh, Penn. Kondu Mfg. Co., Ltd., Preston, Ontario

YOU CAN BE SURE.. IF IT'S
Westinghouse

PROOF
FROM
NEBRASKA

"'CSP' saved us $17,465.50 in our urban radial system"

So said this midwestern operator after installing 650 Completely Self-Protecting distribution transformers.

When the 2,400-volt radial feeders for urban and suburban areas outside the downtown network system became seriously overloaded, distribution voltages were stepped up to 7,960/13,800 volts wye.

Economically, the utility found this comparison of costs *beyond the price of the basic transformer:*

FOR CONVENTIONAL INSTALLATION		FOR "CSP"* INSTALLATION	
Arrester, installed	$30.00	Additional cost of "CSP" over the conventional transformer—includes built-in lightning and thermal protection plus load indicating light.	$34.13
Fuse mounting and fuse, installed	20.00		
Two 8 ft. crossarms, installed	12.00	Higher pole for secondary lead clearances	5.00
3 ft. crossarm, installed	4.00		
Total	$66.00	Total	$39.13

Simple arithmetic makes 650 "CSP" installations save $17,465.50. What's more, *real* protection from overload was secured—with semiautomatic load check as a bonus. Conventional transformers with fuse links could not supply this protection and still withstand lightning surges.

One thing you can be sure of: the built-in protection of "CSP" saves installation costs. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-70526

*Trademark—Reg. U. S. Pat. Off.

HERE'S PROOF FROM U. S. A.—Thirty case histories of Completely Self-Protecting transformers, with names, dates, places, facts and figures. Get your copy of B-4248.

Call the Westinghouse Salesman

WESTINGHOUSE

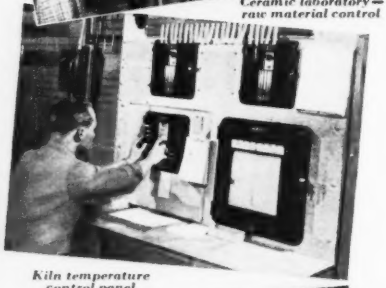
Westinghouse "CSP"

TRANSFORMERS

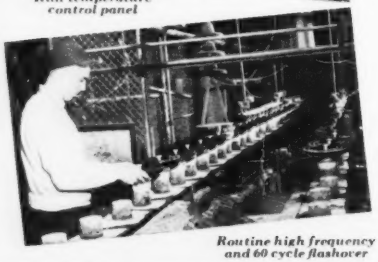
Made in the WEST . . for the WEST

The completely modernized Victor plant; over 300,000 sq. ft. of manufacturing space

Ceramic laboratory—raw material control



Kiln temperature control panel



Routine high frequency and 60 cycle flashover

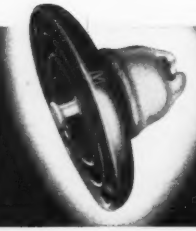
PLANT PERFORMANCE THAT MEANS

Peak Performance

IN HIGH VOLTAGE INSULATORS

High voltage porcelain insulators made at Victor have been acclaimed for their performance on important transmission and distribution systems the world over. This "on-the-job" performance is the result of top performance right in the Victor plant. Through the various processes of porcelain production . . . mixing, extruding, forming and glazing . . . firing, assembling and testing . . . CONTROL is the watchword. It is this modern plant-wide control which assures high voltage insulators of superior performance—*electrically, mechanically, dimensionally*. For your standard or special insulator requirements, specify Victor!

VICTOR
INSULATORS Inc.
VICTOR, NEW YORK



Look for this trade mark of enduring service

V

33. OUTLET BOXES: Each switch, light, wall receptacle, clock and other miscellaneous device for flush mounting shall be provided with an approved type of outlet box, iron or steel, sherardized or galvanized to prevent rusting.

All outlets in plastered wallsand ceilings shall be equipped with covers to bring same flush with plaster finish. Outlet boxes and covers shall be Appleton or approved equal.

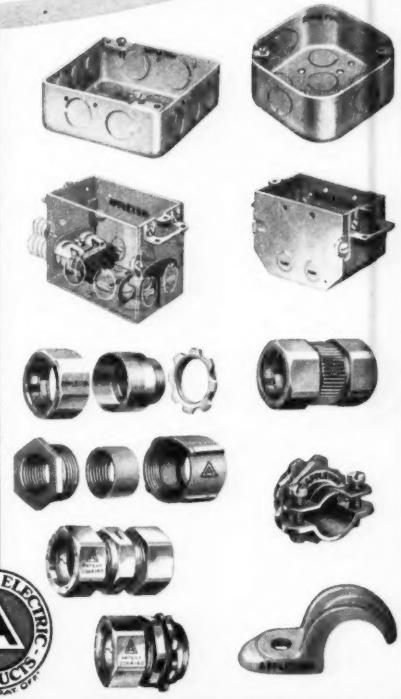
APPLETON in the specifications MEANS PERMANENCE in the building!

One RELIABLE Source for EVERY Electrical Wiring Requirement

The above specifications are from a recent bank building job—a job that called for lasting dependability, first quality throughout. Appleton fittings were specified because they're precision engineered to meet requirements—made to highest standards in Appleton's own foundries and fabricating plants.

Whether it's a simple installation or an intricate system of wiring for a highly hazardous location, you'll find the exact fittings required in the 15,000-item Appleton Line.

Skilfully designed for fast and easy installation, Appleton fittings provide top performance in any type of electrical construction or maintenance. For faster completion of better jobs, specify Appleton, STANDARD FOR BETTER WIRING.



Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY
1709 WELLINGTON AVENUE • CHICAGO 13, ILLINOIS
LOS ANGELES 12, 100 N. Santa Fe Ave.
SAN FRANCISCO 1, 655 Minna Street
SEATTLE 9, 115 Ray Street
DENVER 2, 1921 Blake Street

APPLETON

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

SUNBEAM'S

LIGHTING FOR COMFORTABLE SEEING

1210 SERIES

SUNBEAM'S new 1210 Series has been designed to fulfill the lighting needs of modern, functional architecture. Scientific light distribution with comfortable low brightness and minimum maintenance are factors incorporated in this new luminaire design.

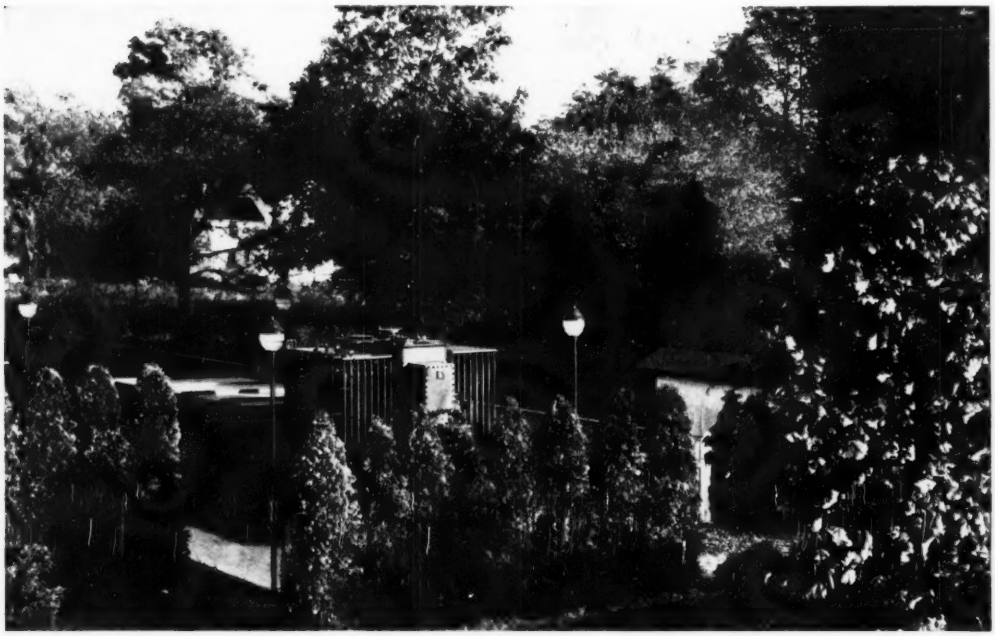
Simplicity of line and appearance assure the quality of their being "architecturally integrated" in any installation.

Designed for all types of commercial installations, SUNBEAM'S 1210 Series have high light output and low brightness. They are available in 2 and 4 lamp 40 watts and 2 lamp 85 watts and 96" slimline. These units have transverse shielding of 36° for the 4 lamp and 45° for the 2 lamp fixtures. The metal louvre hinges from either side for easy maintenance. The starters are hidden yet accessible without removing lamps. The side panels are Corning Alba-lite.

FOR SUNBEAM'S COMPLETE LINE OF ADVANCED LIGHTING FIXTURES SEE YOUR NEAREST LEADING ELECTRICAL DISTRIBUTOR

SUNBEAM LIGHTING COMPANY • 777 EAST 14TH PLACE • LOS ANGELES 21, CALIFORNIA

Can beauty and utility be one?...



THIS question must be faced when you consider the use of substations in residential areas where appearance is a factor.

The answer is. . . .

No. . . . when you consider "piece-meal" substations with their unsightly looks and space-consuming design.

Yes. . . . when you use General Electric *unit* substations.

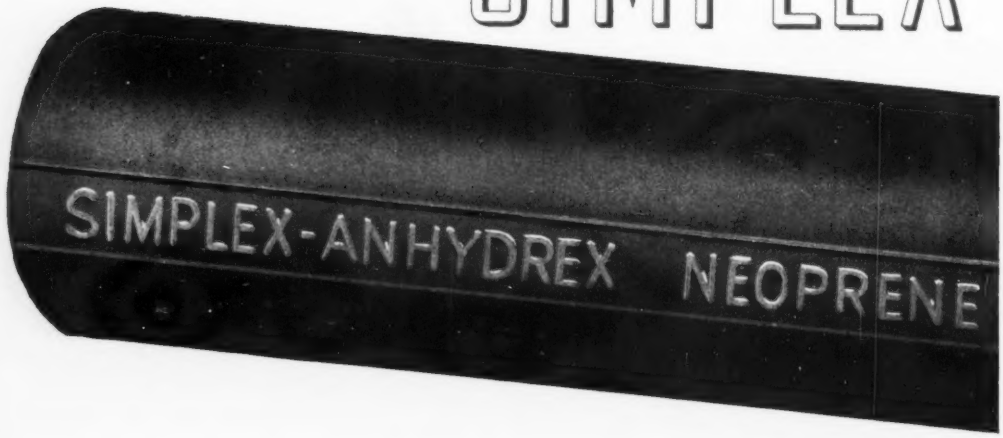
This problem was solved for many utilities when G-E engineers showed them how G-E unit substations with their smooth, integrated lines—plus some incidental landscaping—would easily overcome appearance objections. At the same time the utilities realized the many benefits—such as lower costs and increased reliability—of G-E load-center power distribution.

We'd like to show you how other utilities utilized G-E unit substations. Give us a call, or write for brochure GEA-5155 that shows how you can utilize G-E engineering and service. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

SIMPLEX-



. . . a great new insulation perfected in the

The Simplex Laboratories have again contributed a remarkable development in the field of rubber chemistry. They have perfected a new rubber insulation. It is the only insulation to combine high temperature resistance, long life and ozone resistance with extremely high electrical stability when exposed to water for extended periods of time. No other insulation combines all these four properties in the same remarkable degree possessed by Simplex-Anhydrex XX insulation. This insulation is truly a remarkable demonstration of the value of the Simplex Research Laboratories as they affect your wire and cable problems.

Simplex-Anhydrex XX has High Heat Resistance

This great new insulation has extremely high heat resistance. Simplex guarantees that Simplex-Anhydrex XX insulation will operate at 176° F. (80° C.) in dry locations up to and including 8,000 volts, and 167° F. (75° C.) under all other conditions of installation and operating voltages. This means increased current loads for cables insulated with Simplex-Anhydrex XX and less chances of failure at times of inevitable overloads than can be safely expected with any other type of high voltage rubber insulation.

Simplex-Anhydrex XX has Great Ozone Resistance

Simplex-Anhydrex XX is, to all intents, inert to the action of ozone, oxidizing agents and sunlight. An 0.010 to 0.015% concentration of ozone by volume is considered a severe test for new, unaged rubber compounds to withstand for only three hours. Yet even after being aged in an air oven for 7 days at 250° F., Simplex-Anhydrex XX insulation will withstand 0.03% concentration for hours and hours. It can safely be said that Simplex-Anhydrex XX

ANHYDREX XX

Simplex Laboratories

insulation is practically invulnerable to the attacks of ozone, sunlight and other oxidizing agents. It has, therefore, an extremely long service life.

Simplex-Anhydrex XX has Remarkable Moisture Resistance

Any cable which is put underground, either in ducts or otherwise, needs high resistance to water absorption. Simplex-Anhydrex XX has this resistance to a truly remarkable degree. We will guarantee that the maximum water absorption of Simplex-Anhydrex XX, after the severe aging test of 7 days in air oven at 250° F. (121° C.), will not exceed 15 milligrams per square inch of exposed surface when immersed in distilled water at 70° C. for 7 days.

We will gladly send you further information without obligation, of course, if you will send your inquiry to the address below.

Simplex WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

Title 608 Project: Courtesy James G. Ludwig, R. A., Architect, West Chester and Upper Darby, Pa.

Architects, builders and electrical contractors are switching to GENERAL SWITCH equipment because it is:

Available everywhere through leading wholesalers—No lost labor time waiting for GENERAL equipment to reach the job.

Economical to install—Takes less time to install because of compact open construction, integral internal conductors and spacious wiring room.

Thoroughly dependable—Quality materials, rugged design, and rigid factory inspection.

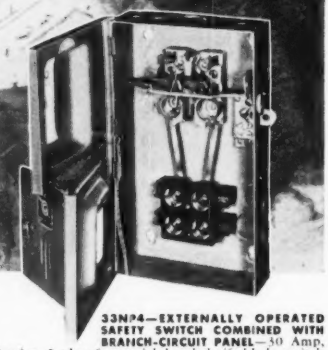
HERE are three units of GENERAL equipment which have been "application engineered" for and are particularly well suited to low-cost housing construction:

GENERAL SWITCH 33NP4—Ideal selection where an externally operated switch is required in combination with a residence panel at the point of service entrance. Has the advantage of dead front branch circuit fuses yet the entire unit is readily accessible with spacious wiring room. Also available in raintight construction.

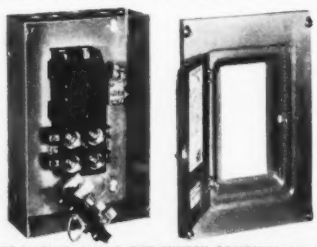
GENERAL SWITCH 3614—Where a pull-out switch may be used, this equipment offers economy, versatility and compactness. Available for flush or surface mounting. Has sub-feed pressure connectors which may be used as main lugs, leaving the pull-out switch available for range, water heater or other circuit.

GENERAL SWITCH 33NP and 104—When it is desirable to have the branch circuit fuse panel conveniently located remotely from the switch, this service entrance switch and plug fuse panel has wide acceptance. Residence panel available for flush or surface mounting.

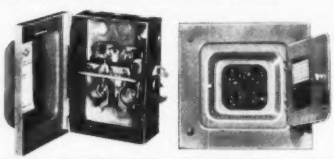
For availability, economical installation and trouble-free performance *the switch is to* GENERAL. Available everywhere exclusively through Wholesalers.



33NP4—EXTERNALLY OPERATED SAFETY SWITCH COMBINED WITH BRANCH-CIRCUIT PANEL—50 Amp, 3 wire, 2 plug fuse quick-break knife blade switch with four plug fuse branch circuits. Bus-bars between switch and fuse block save wiring time.



3614—SINGLE PULL OUT SWITCH COMBINED WITH BRANCH-CIRCUIT PANEL—Available in 50 or 60 Amp with up to 6 branch circuits or in 60 Amp with as many as 12 branch circuits. Surface or flush.



33NP—EXTERNALLY OPERATED SAFETY SWITCH—3 wire, 2 plug fuse quick-break knife blade switch for use as service entrance equipment.

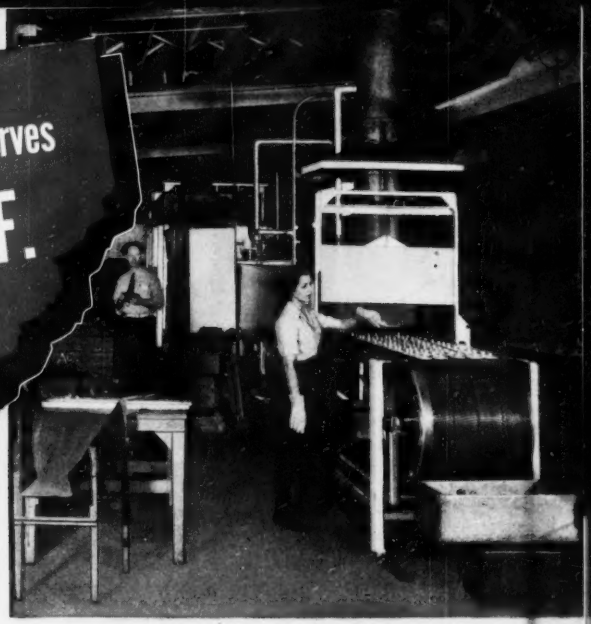
104—BRANCH-CIRCUIT or RESIDENCE PANEL—Available up to 32 plug fuse circuits. Flush spring catch. Surface or flush.

Ask your wholesaler or write today for the GENERAL SWITCH 68-page catalog

GENERAL SWITCH CORP.

49 ROEBLING STREET, BROOKLYN 11, N. Y. • *Sales Offices in every major city*

Record-breaking NICHROME* V Belt serves 7,000 hours at 2050°F. in Copper Brazing Furnace!



Delivery end of electric copper brazing furnace operated by National Stamping Company—brazed steel parts being delivered by continuous-mesh Nichrome V Belt.

BELT SPECIFICATIONS
length: 98' 6"
width: 20"
mesh : 3/8"
wire : 12 gauge Nichrome V

. . . actual life of this belt extended for many thousand hours more (a large percentage of the time at steel annealing temperature of 1840°F.), but its long service at 2050°F. makes its performance outstanding . . . in fact, puts this belt "at the head of the class."

For though wire belts may last, according to an internationally recognized furnace manufacturer, "practically forever" at lower temperatures such as 1300°—1400°F.—often employed for considerable periods in furnaces of this type—their useful lives are measured by service rendered under heat at 2050°F.

ALL KNOWN RECORDS BROKEN

Says Ashworth Bros., Inc., maker of the belt: "This Nichrome V wire belt was installed in a modern electric copper brazing furnace and operated at the Detroit plant of National Stamping Company from June 1, 1947 to September 24, 1948. Its history, including approximately 7,000 hours at 2050°F. under full load, indicates ***it broke all records for this type of service.***"

MORE OUTSTANDING FACTS

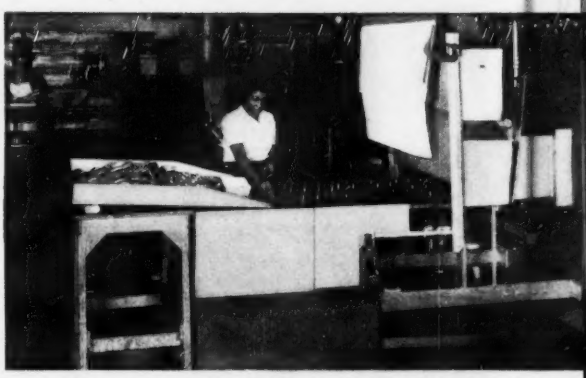
Further information only emphasizes the noteworthy performance of this veteran piece of furnace equipment. For example:

(a) Belt Size—belts of this size, 98' 6" long x 20" wide, must be exceptionally stable to give such long and efficient service.

(b) Production—approximately 380 lbs. of work were handled per hour.

YOUR HEAT-TREATING PROBLEMS AND DRIVER-HARRIS

In selecting *your* heat-treating equipment, remember the outstanding ability of Nichrome V to give top-level performance at high temperatures, such as that of copper brazing. And remember, too, that Driver-Harris has been engaged in finding the correct answers to furnace problems for more than 35 years. Our accumulated experience and unique specialized knowledge will help you to lower operating costs, reduce maintenance, minimize repairs, increase production.



Feed end of furnace—parts being placed on Nichrome V belt
(This belt supplied by Ashworth Bros., Inc., Worcester, Mass.)

50TH YEAR · SPECIAL PURPOSE ALLOYS SINCE 1899 · TRADE MARK REG. U. S. PAT. OFF. · D/H · 1899 - 1949

Nichrome is manufactured only by

Driver-Harris Company

HARRISON, NEW JERSEY

BRANCHES: Chicago, Detroit, Cleveland, Los Angeles, San Francisco, Seattle

*T. M. Reg. U. S. Pat. Off.

6 Ways to Look

IMPORTANT DETAILS MAKE THE DIFFERENCE IN ALLIS-CHALMERS UNIT SUBS

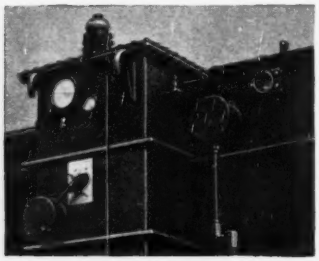
MANY DETAIL IMPROVEMENTS in unit substations have been pioneered by Allis-Chalmers: controlled gasket compression, protective *Oil-Sealed* inert gas system, "quick-break" contact separation, finger-type disconnects, no-corona taped bus joints, flexible drop collar throat, and others.

Together such improvements make up the real difference between superior and average performance. They are good points to look for, and compare, when purchasing unit substations for your distribution system.

±10% Regulation Results in Added Savings

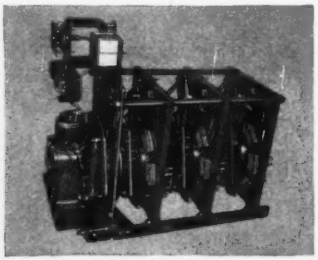
Allis-Chalmers unit substations cost less because of standardization on one range. This reduces your cost because the savings in engineering and manufacturing have been passed along to you. ±10% range was chosen since it fits most utility requirements and permits more load than ±7½%.

Call in your nearby A-C representative and have him go over the advantages you get with Allis-Chalmers unit substations. Or write direct.



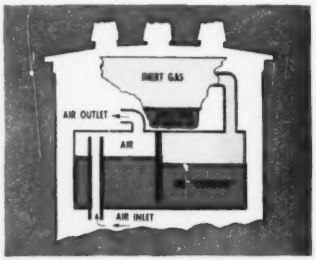
1. SAFETY

NO-LOAD TAP CHANGER on side of tank protects operator from accidental contact with overhead high voltage lines. Other safety features include: dead-front panels; interlocks; vertical lift breakers; drawout potential and control power transformers. Protects your operators, your equipment and your service.



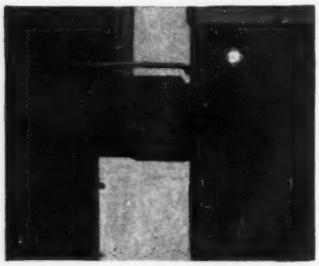
2. REGULATION

±10% RANGE is adequate for virtually any distribution substation. The narrow ⅝% steps of the tap-changing mechanism keep voltage fluctuations to a minimum. Oversize contacts and snap action minimize contact burning. Sturdy mechanism and motor operate in oil for maximum life.



3. MAINTENANCE

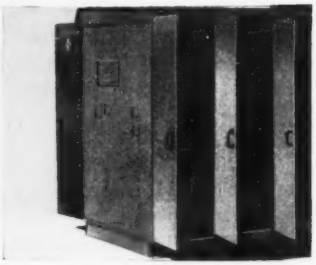
OIL-SEALED inert gas system uses no valves or external gas supply — reduces maintenance to routine gage readings. There are no external gas bottles to replenish, no waste gas. This system operates at pressures usually less than a pound . . . minimizing chance for gas leakage through gasketed joints.



4. INSTALLATION

DROP COLLAR throat saves time and money in preparing foundations. There is no need for exact alignment between transformer and switchgear because flexible connectors are used.

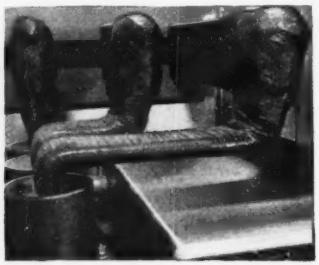
Switchgear units are shipped in groups as large as can be conveniently handled at the installation site.



5. ACCESSIBILITY

SWITCHGEAR HOUSING has doors front and rear permitting easy access to breakers; current, potential and control transformers; fuses.

Feather-Touch control for tap changer is in accessible cabinet. A transparent plastic cover for the voltage integrator permits inspection without breaking dust-tight seal.



6. FLEXIBILITY

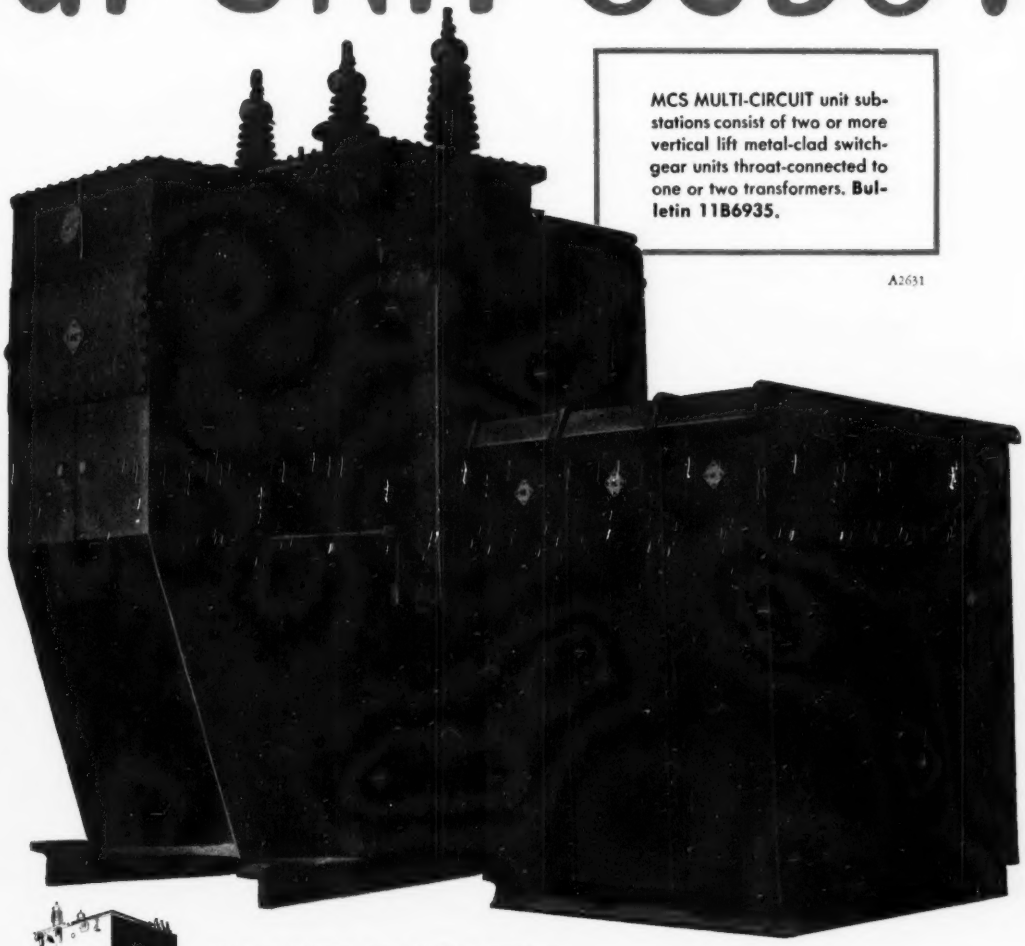
TAPED AND BOLTED connections reduce time and trouble involved in changing connections. No time is lost preparing compound in the field or filling connection boxes.

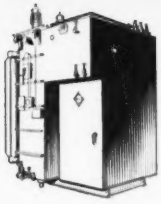
Standardized construction simplifies the addition of new switchgear units when more circuits are needed.

at UNIT SUBS!

MCS MULTI-CIRCUIT unit substations consist of two or more vertical lift metal-clad switchgear units throat-connected to one or two transformers. Bulletin 11B6935.

A2631





ALLIS-CHALMERS SCS SINGLE CIRCUIT unit substations consist of a transformer, secondary breaker and control, *Oil-Sealed* inert gas system for protecting oil, and the 32 5/8% step regulator mechanism for ±10% range of regulation — all combined within a single housing. They can be installed as a unit.

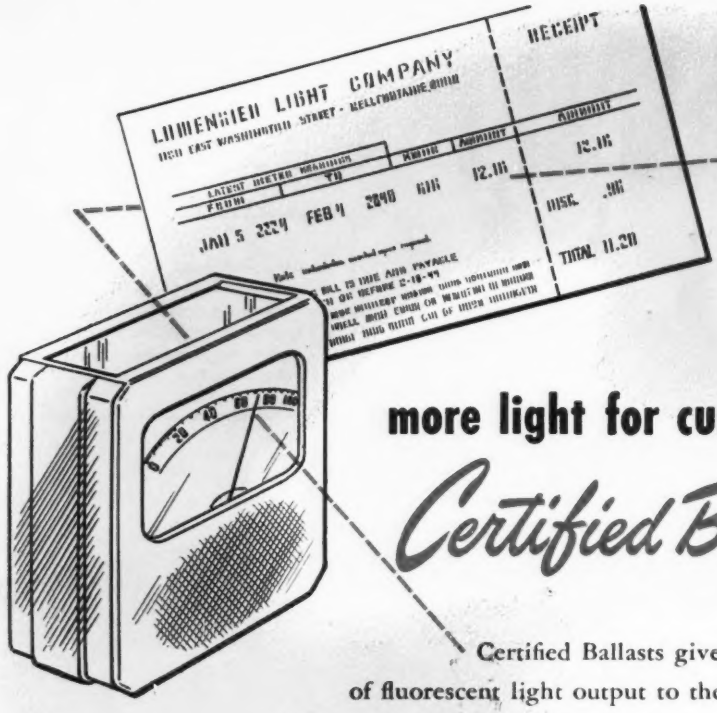
ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

Feather-Touch and *Oil-Sealed* are Allis-Chalmers trademarks

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

Pioneers in Load Ratio Control — Originators of 5/8% Step Regulation



more light for current used!

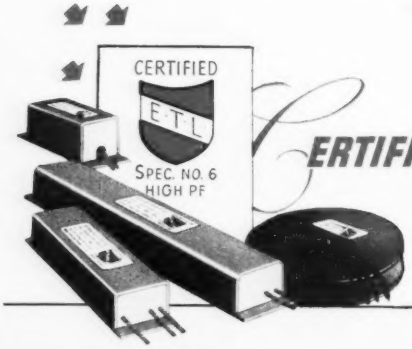
Certified Ballasts

Certified Ballasts give a high ratio of fluorescent light output to the input of power —deliver more light for the electricity used.

When you specify Certified Ballasts, your customers are assured of:

Rated light output
Full lamp life
Dependable performance

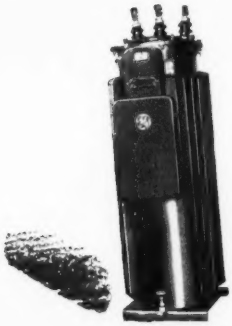
Because Certified Ballasts are made to exacting specifications, then tested and checked by Electrical Testing Laboratories, Inc., an impartial authority, they assure customer satisfaction—and proved economy.



CERTIFIED BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting

2116 KEITH BLDG., CLEVELAND 15, OHIO



this is the Voltage Regulator...

General Electric's present-day Induction-type Feeder Voltage Regulator comes as close to being maintenance-free as any electrical equipment with moving parts.

Since there are no arcing contacts in the IRS regulator, designers were free to seal the tank completely. By doing this, they sealed out atmospheric air, moisture and other contaminants. The life of the insulating oil—and consequently the regulator—is greatly prolonged.

These regulators give accurate, stepless regulation, with no time-delay. They respond immediately to voltage changes and will provide correction at an average rate of one per cent in $1\frac{1}{2}$ seconds throughout the entire range of ± 10 per cent regulation.

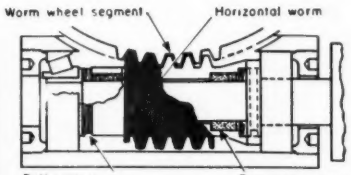
Write for Bulletin GEA-2985C which gives a full description of the Type IRS induction regulator—of its basic design which has been standard for eight years, and of the refinements, particularly in control-panel arrangement, which have recently been incorporated at the suggestion of users. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

● RESPONDS TO VOLTAGE VARIATIONS —IMMEDIATELY

The IRS Induction Voltage Regulator provides smooth, stepless voltage correction without the retarding action of a time delay relay which wastes investment because of *idle* regulation.

● FEWER PARTS TO WEAR FEWER PARTS TO MAINTAIN

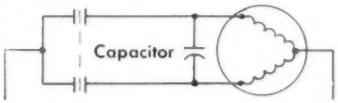
The IRS Induction Regulator has *only three shafts* (including the motor) . . . all mounted in roller or ball bearings, all operating under oil.



Details of Spring-cushioned Worm

● NON-CHATTERING LONG-WEARING GEARS

One gear train, a double-worm reduction, provides a drive which is simple, silent, self-locking and *positive*. There are no ratchets, pawls, or chains to introduce uncertain operation and questionable life.

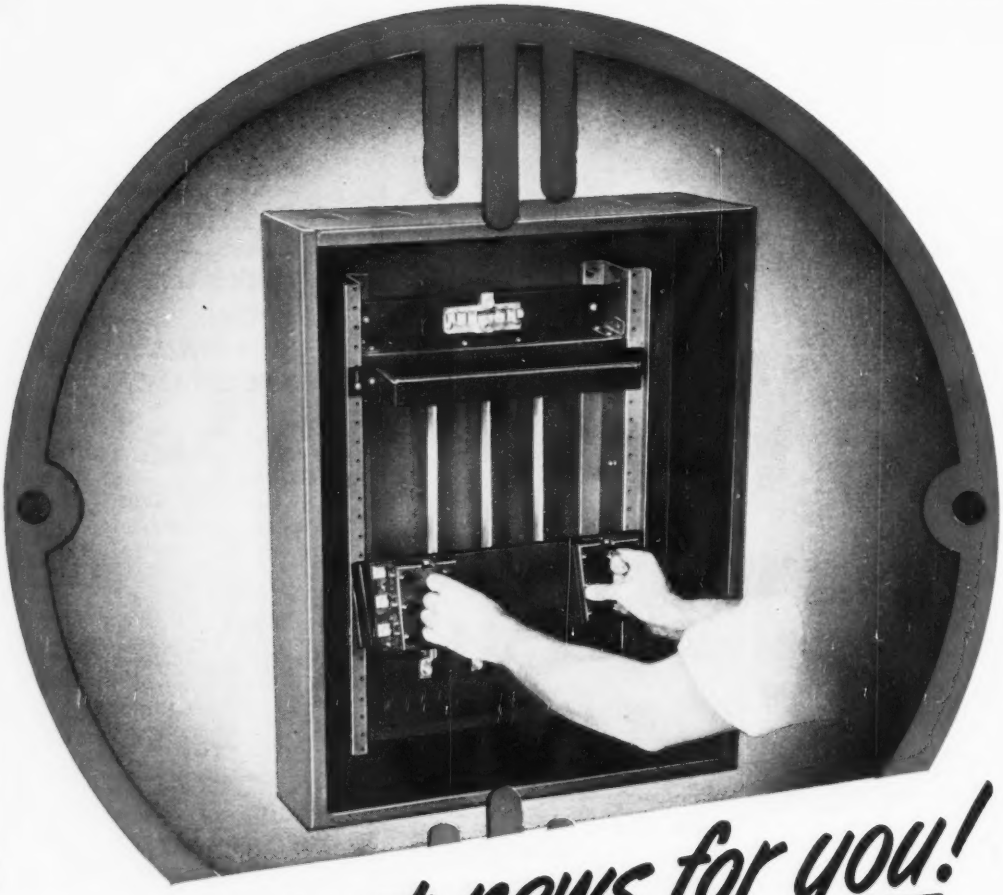


● SIMPLE DYNAMIC BRAKING

The capacitor, that gives the motor its high starting torque, automatically provides strong braking action when the motor supply circuit is opened. No separate braking circuits are needed. There are no mechanical devices to adjust.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.



Important news for you!

Lowest prices! Fastest installation! Instant delivery!
. . . Now you can assemble in minutes the new, exclusive
Federal Noark Flexunit Plug-In Distribution Panelboard

IN THE DISTRIBUTION PANELBOARD FIELD the whole picture has been changed by a brand new Federal Noark development. Now you can assemble Plug-In Distribution Panelboards to your exact requirements – from the wholesalers' stock of standard parts. It takes only minutes . . . slashing installation costs. No more waiting for factory assemblies. And what's more, through mass production the Federal Noark Flexunit Plug-In Distribution Panelboard sells for less.

Four standardized surface cabinets in two sizes of main lugs (200 and 400 ampere), provide for a maximum of:

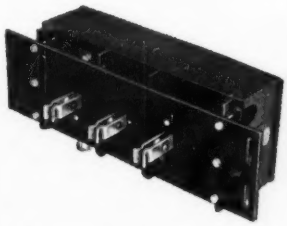
★ Twenty-four 30 ampere, 3 pole, 230 volt or sixteen 60 ampere, 3 pole, 230 volt branches in a panelboard for 230 volt service.

★ Lesser combinations of 30, 60, 100 ampere, 575 volt units; or 30, 60, 100, 200 ampere, 230 volt units may be assembled in a Flexunit Plug-In Distribution Panelboard.

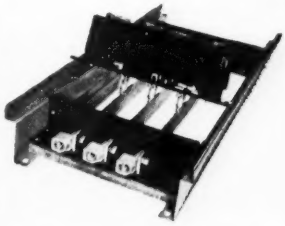
★ Filler plates to cover unused spaces are available in four sizes.

Start cashing in today on the faster service and lower prices offered by Federal Noark Flexunit Plug-In Distribution Panelboards. Mail the coupon for complete data on this revolutionary new improvement. Federal Electric Products Co., 50 Paris St., Newark 5, N. J.

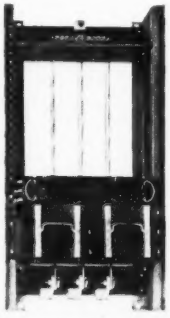
1 Federal Noark chassis has three silver-plated copper bus bars, of 200 or 400 ampere rating, arranged on edge to receive the plug-in units. Spacing ample for 575 volts! Neutral provides for 3 phase, 4 wire; and single phase, 3 wire services.



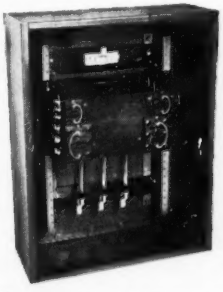
2 The rugged plug-in Flexunits are complete with fusible pull switches. They are available with twin 30, twin 60, 30-60, twin 100 and single 200 ampere switches for 230 volts A.C. Twin 30, twin 60, 30-60 and single 100 ampere switches for 575 volts A.C.



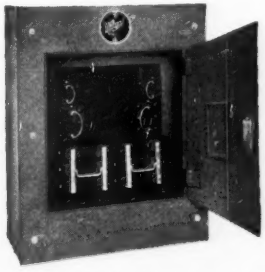
3 Snap! . . . and the Flexunit is in place. When secured by screws, the popular Wurdack pull switch units are ready to operate with a simple pull, turn and push. Designed for absolutely positive action, they clearly indicate "On" and "Off" positions.



4 Here, mounted in the chassis are two plug-in Flexunits. Unused space can be covered with filler plates giving a dead front panel when the panelboard is completed. Then additional Flexunits can be added simply, easily, as needed.



5 Note the ample gutter space available when chassis is mounted in the box. At the top are the neutral bar and terminals so that panel can be used on the increasingly popular three phase, 4 wire service, as well as on single phase, 3 wire service.



6 The completed Federal Noark Plug-In Distribution Panelboard assembled with twin 30, twin 60 and twin 100 ampere fusible Flexunits and narrow filler unit at top. Both box and trim are code gauge steel, complete with standard hardware.

7 All essential elements of the new Plug-In Distribution Panelboard have been proved through years of outstanding service. The plug-in stabs are a well-known feature of both Federal Noark Bus Duct and Control Center plug-in units. The Wurdack pull switch units are recognized as standard, everywhere! Get the complete facts. Mail the coupon, right now!

Federal Electric Products Company,
50 Paris Street, Newark 5, New Jersey

Gentlemen: Please send me full data on the Federal Noark Flexunit Plug-In Distribution Panelboard for better service, lower installation costs.

My name .....

Company name .....

Address .....

City ..... Zone..... State.....

Name of our wholesaler .....

.....

FEDERAL NOARK

FLEXUNIT PLUG-IN DISTRIBUTION PANELBOARDS

Complete line of Federal Electric Products includes Motor Controls, Safety Switches, Service Equipment, Circuit Breakers, Panelboards, Switchboards, Control Centers, Bus Duct ★ Sales offices in principal cities.

CRESCENT
SYNTHOL BUILDING WIRES

TYPE TW
For Both Wet and Dry Locations

FOR BETTER WIRING

Simplify Your Stock Problem

USE THIS ONE TYPE FOR ALL YOUR BRANCH CIRCUIT REQUIREMENTS

CRESCENT SYNTHOL —Type TW, Building Wires and Cables are insulated with a special, tough, thermoplastic compound that results in wires of unexcelled Permanence, Safety, Adaptability and Value. They combine high dielectric and mechanical strength with the following desirable features.

SMALL DIAMETER—has smallest outside diameter for same conductor size, permitting more conductors, or larger conductors in same space.

FLAME RETARDING—SYNTHOL insulation will not support combustion.

LONG LIFE—practically unaffected by continuous exposure for years to sunlight or air; more stable than any rubber insulation.

RESISTANT to moisture, acids, alkali and most chemical solvents.

OILPROOF—cutting oils, greases and petroleum solvents do not injure SYNTHOL.

BRIGHT COLORS —non fading, the insulation is the same color throughout so color will not scrape off; easily cleaned; twelve colors.

FREE STRIPPING —makes splicing and soldering easier and faster.

EASY PULLING—because SYNTHOL wires have a permanent clear wax lubrication on their hard, smooth, abrasion resistant surface.

AVAILABLE FROM LOS ANGELES WAREHOUSE
Murphy-Hain Co., 720 E. 2nd St., Los Angeles 12, Calif.

CRESCENT
WIRE & CABLE
CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

Only FLEUR-O-LIER gives ALL these advantages:

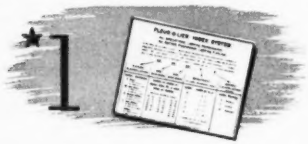
★ Fleur-O-Lier Index System Rating

★ Photometric Data

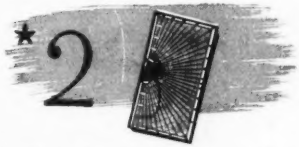
★ Coefficients of Utilization Charts

★ Certification

MORE AND MORE architects, utility lighting men and contractors are recommending Fleur-O-Lier labeled fixtures because only with Fleur-O-Lier certified fixtures do they get *all* "the facts of light" that enable them to get the most fixtures for their money.



Every Fleur-O-Lier fixture is rated on the Fleur-O-Lier Index System to show its tested illuminating performance.



Complete photometric data, as found by Electrical Testing Laboratories, Inc., is provided.

Coefficients of utilization charts, compiled by Electrical Testing Laboratories, Inc., enable the buyer to select the most suitable fixture for his installation.

Certification, backed by Electrical Testing Laboratories, Inc., tests, is the buyer's assurance that the fixtures were made to rigid specifications covering electrical and mechanical features.

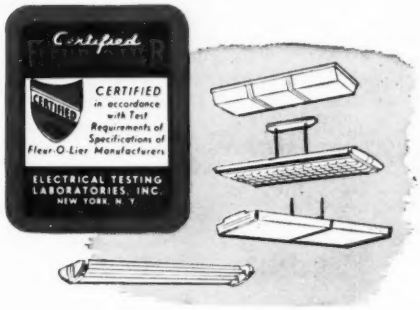
Specifiers and buyers are now insisting, "Be sure the fixtures bear the Fleur-O-Lier label!"

FLEUR·O·LIER

Manufacturers

2116 Keith Building • Cleveland 15, Ohio

Fleur-O-Lier is not the name of an individual manufacturer, but of a group of fixtures made by leading manufacturers. Participation in the Fleur-O-Lier program is open to any manufacturer who complies with Fleur-O-Lier requirements.


Certified
CERTIFIED
CERTIFIED in accordance with Test Requirements of Specifications of Fleur-O-Lier Manufacturers
ELECTRICAL TESTING LABORATORIES, INC.
NEW YORK, N. Y.

It's easy TO SELECT THE WEDGES YOU NEED FROM THIS...

YOURS FOR THE ASKING

Inmanco SAMPLE CARD OF WOOD WEDGES

Select the wood wedges you need in a jiffy with an Inmanco Wood Wedge sample card. Actual wood samples of the eight styles and 48 sizes immediately available from stock, and a list of 250 other sizes and shapes, make ordering easy.

The savings in time and effort you gain by using this free sample card are carried right through to the assembly line . . . for Inmanco Hard Maple Wedges are tough . . . they withstand rough assembly abuse, lower material breakage costs. And tumbling in paraffin gives them high moisture resistance . . . permits speedy insertion into slots.

To get your free sample card or to obtain more information on Inmanco Wood Wedges, just send your name and address to one of the offices listed below. Do it today.

Wedgie says:

"Straight-grain hard maple makes it possible for Inmanco Wedges to be used for really tough applications—applications requiring a wedge that won't splinter, sliver, or fracture under most assembly conditions."

Inmanco Hard Maple Wood Wedges are made exclusively by Insulation Manufacturers Corporation

WHERE TO GET INMANCO WOOD WEDGES

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Insulation and Wires Incorporated

ATLANTA, GA.
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CHICAGO, ILL.
Complete Roofing Electric Co., Inc.
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CLEVELAND, OHIO
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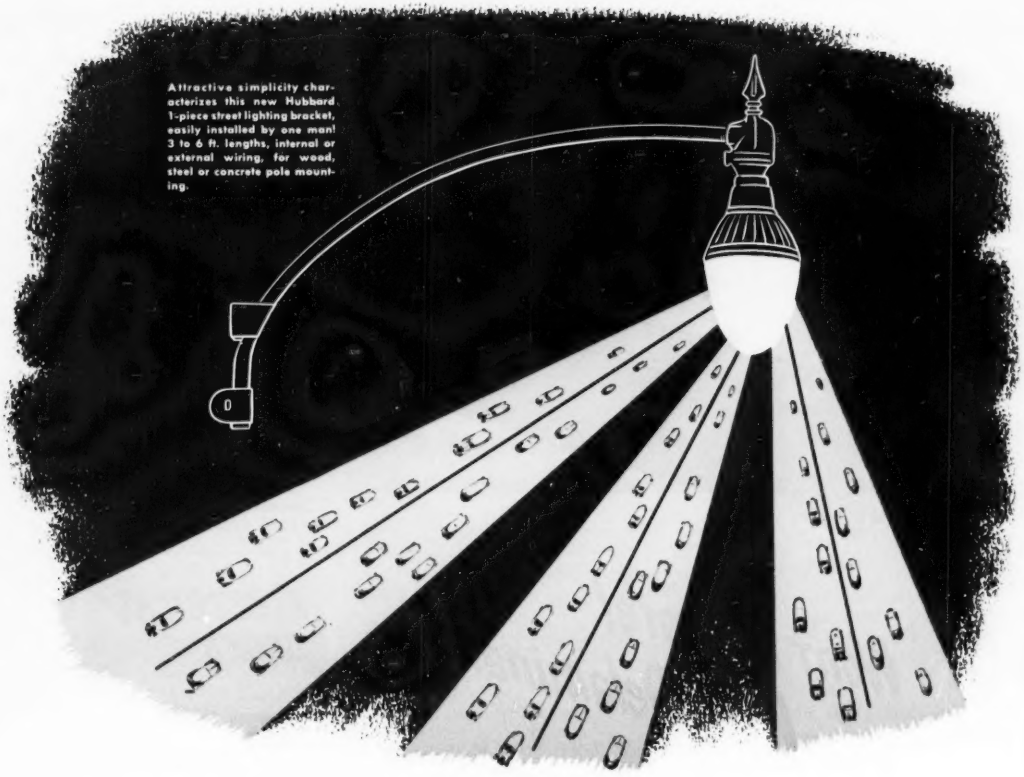
Electrical Specialty Company
Insulation and Wires Incorporated
Tri-State Supply Corporation
Western Fiberglas Supply, Ltd.

SEATTLE, WASH.
Electrical Specialty Company
Tri-State Supply Corporation


Attractive simplicity characterizes this new Hubbard 1-piece street lighting bracket, easily installed by one man! 3 to 6 ft. lengths, internal or external wiring, for wood, steel or concrete pole mounting.

Safe avenues of light depend on **HUBBARD** *lighting hardware*

Maximum *safety* on streets or highway requires proper lighting that is *permanently dependable*. Every HUBBARD lighting bracket is precisely engineered to withstand the merciless beating of wind and vibration. Sharp edges are carefully eliminated for permanent insulation protection. HUBBARD'S famous bonded hot double-dip Galvanizing gives life-time defense against rust and corrosion. Equipment to match existing systems or meet your new specific requirements is available for quick delivery from HUBBARD'S complete Western engineering and manufacturing facilities and stocks—through Graybar Electric Company, Inc., or General Electric Supply Corporation. For greater street and highway safety, think first of HUBBARD!

HUBBARD AND COMPANY

PITTSBURGH OAKLAND, CALIFORNIA CHICAGO

HANG THE LOAD ON HUBBARD HARDWARE

IRV-O-SLOT

The slot insulation *Bound* to last longer

Won't Migrate! Won't Delaminate!

The big news about Irv-O-Slot is good news for motor manufacturers. This famous slot insulation, with all its excellent electrical characteristics, benefits by a new, specially-developed Irvington binder that doesn't harden or lose its tack; that provides full assurance against migration . . . against delamination . . . against oozing out under heat. Thus Irv-O-Slot provides far greater service life, and far longer shelf life as well; and the thickness of the finished insulation is held within exact tolerance limits.

***Test Data:* The normal delamination test for slot insulation is 96 hours at 125 C. Laboratory tests show Irv-O-Slot withstands 150 C for over 288 hours, retaining full bond without migration.**

Irv-O-Slot is available in straight-cut or seamless bias varnished cambric bonded to either fish paper or rag stock. Write for generous test samples, further information.

"Look to Irvington **for Continued Leadership in Insulation"**

STANDARD OF THE WORLD — IRVINGTON INSULATION

IRVINGTON

Varnish & Insulator Company

Irvington 11, New Jersey

Represented in the Western States by
C. D. La Moree, Los Angeles, Berkeley, Seattle; Electric Motor Supply Co., Denver

LETTERS TO THE EDITOR

To the Editor:

Over this past weekend I had my first opportunity to go completely through the June issue of ELECTRICAL WEST, and what I have read calls for some comment.

It seems to me this issue is packed with the finest material your excellent publication has carried, at least in my memory, in support of the general principles of Free Enterprise and Americanism. Several of the very fine articles and your own editorial are excellent examples of the type of thing we all should be thinking and talking continually.

It hasn't been a habit with me for some reason to write "letters to the editor" but this fine issue has driven me into action!

Congratulations to you and your entire staff for such an excellent contribution. We only hope the average reader has taken the time to really study this issue.

J. Clark Chamberlain

Secretary-Manager, Bureau of Radio and Electrical Appliances of San Diego County.

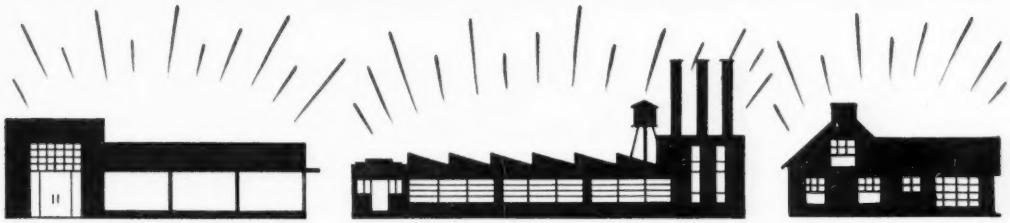
ELECTRICAL BOOKS

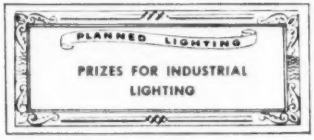
HOUSEHOLD ELECTRIC REFRIGERATION, by John F. Wostrel and John G. Praetz, 458 pages, 6x9, McGraw-Hill Book Co., $4.50. Presents complete information needed by the man who wishes to service electric refrigerators from a simple explanation of how refrigerators work, to detailed practical methods and data on installation, testing, servicing, adjusting, trouble shooting and repairing. Covers popular makes of machines showing entire system and details of parts.

COMMUNICATION CIRCUITS Third Edition by Lawrence A. Ware and Henry R. Reed, 303 pages, 6x9, John Wiley & Sons, $5. Covers essentials of transmission and such subjects as filters, impedance matching and wave guides. In the third edition considerable material has been added and a change in certain treatments has been made. Features of this edition include use of rationalized MKS system of units, a radical revision of the chapter on transmission line parameters, treatment of attenuation in wave guides based on Poynting's theorem, new problems and extended discussion of many subjects.

MAINTENANCE MANUAL OF ELECTRONIC CONTROL, edited by Robert E. Miller, 304 pages, 6x9, McGraw-Hill Book Co., $4.50. Practical maintenance and service manual for the electrical and electronic technician. Reflects the experience and knowledge of engineers who are specialists in their fields. Covers electronic motor and welding control, adaptation of tools and instruments for electronic equipment trouble shooting, timing relays, time-delay relays, photoelectric relays, furnace temperature controls and mercury-arc rectifiers.

$21,000 CASH PRIZES OFFERED IN GENERAL ELECTRIC'S BIG PLANNED LIGHTING COMPETITION!





Extra money for you in your Planned Lighting jobs! 192 separate prizes for:

Utility Lighting Representatives
Wholesaler's Salesmen **Architects**
Fixture Manufacturer's Salesmen
Electrical Contractors **Retailers**
Builders **Lighting Consultants**

IF you have a hand in planning, selling, supplying, or installing a 1949 General Electric Lamp Planned Lighting job, you're eligible for as much as $250 in cash prizes! There's a total of 36 awards—24 for commercial and industrial installations—12 for residential. Each award includes several $100 cash prizes for those cooperating in planning, selling and installing the lighting—192 cash prizes in all. In addition, the person sending in the report on the winning installation receives an *extra* $150.

You can enter both initial and relighting installations. Judging will be on the basis of how well the installation did the desired lighting job for the user.

SELECT YOUR ENTRIES NOW

Every Planned Lighting job has a chance to win. All entries in this competition must be in the mail no later than January 31, 1950, so get your planned lighting installations under way. If you don't already have the complete rules for the General Electric Planned Lighting Awards, call your local General Electric Lamp Department office.

CHECK THESE NEWEST G-E SALES HELPS!

Here are four of the latest Planned Lighting sales tools from General Electric. Make sure you use them all. They're available through your General Electric Lamp District office.

1. **"THE LIGHT IN YOUR LIFE"**—a fast-moving, full color movie on lamps and lighting.
2. **PLANNED LIGHTING GUIDEPOSTS**—a complete selling manual.
3. **"THE GREENHOUSE"**—a Kodachrome sound-slide film on the latest ideas on home lighting.
4. **"LIGHTING EQUIPMENT MERCHANDISERS"**—a 56 page guide to increased selling at the point-of-sale.

GE LAMPS

GENERAL ELECTRIC

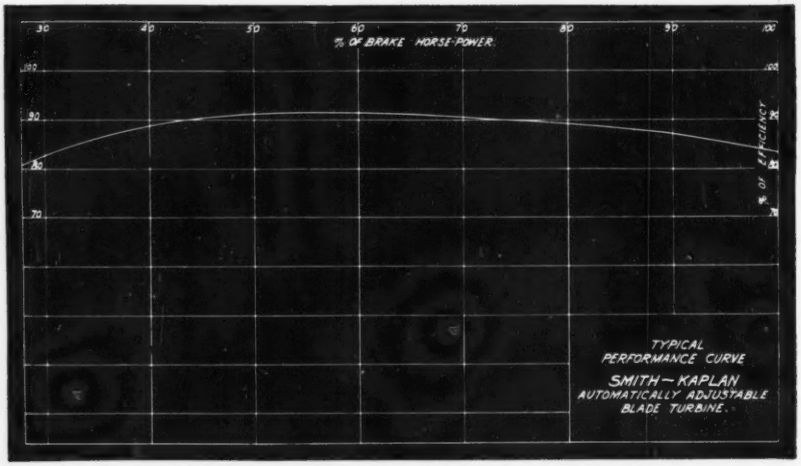
The SMITH-KAPLAN TURBINE

PROOF of value! - ten of these 75,000 Hp. units installed at Bonneville!

The Smith-Kaplan Turbine affords users high efficiency over a wide range of load, as a study of the accompanying Graph will reveal. Write for data.

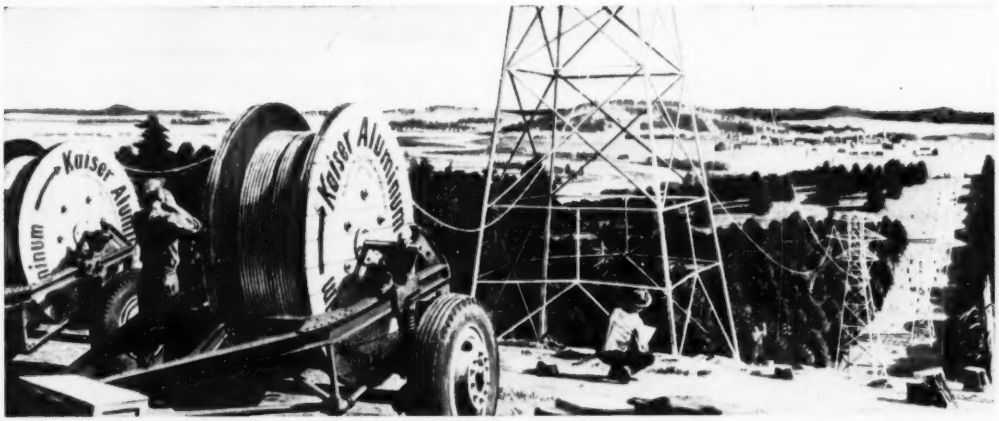
If It's Hydraulics - Put It Up to Us!

S·MORGAN SMITH COMPANY
·YORK· PENNSYLVANIA · U·S·A·



POWER *by* SMITH

A major new source of Cable...



RIGHT NOW, Kaiser Aluminum Cable and ACSR is being delivered to public and private power enterprises—serving industry and farms—from coast to coast. Produced at Permanente Metals' strategically located Newark, Ohio plant—which has an annual capacity of more than 100 million pounds—this top-quality electrical conductor is available to you in a complete range of standard sizes and standard strandings.

brings more power to America!

KAISER ALUMINUM CABLE is tested by the most modern equipment in the country, including a new 100,000 pound, 50-foot tensile machine designed and built especially for Permanente Metals. Thus you are assured unsurpassed quality, at competitive prices. To take advantage of *some early delivery schedules which are still open,* act now. Inquire at any Permanente Products' sales office—in major cities from coast to coast.

Permanente Metals

PRODUCER OF

Kaiser Aluminum Cable

Completely Controlled for Quality

Permanente Metals' integrated operation completely controls the quality of Kaiser Aluminum Cable—from the processing of bauxite to finished cable.

Such quality control . . . plus a record for service that is unsurpassed . . . explains why thousands of manufacturers in many fields consistently use Kaiser Aluminum.

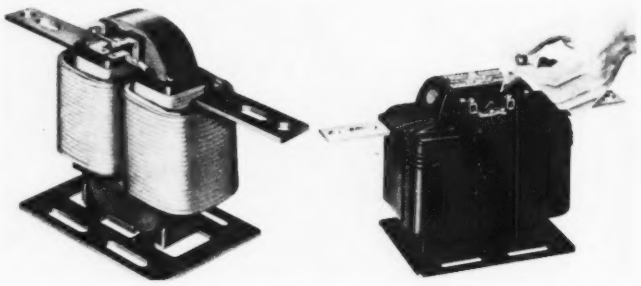
SOLD BY PERMANENTE PRODUCTS COMPANY, KAISER BLDG., OAKLAND 12, CALIFORNIA . . . WITH OFFICES IN:
Atlanta • Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Houston • Indianapolis • Kansas City • Los Angeles
Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Portland, Ore. • Seattle • Spokane • St. Louis • Wichita

Also available through General Electric Supply Corporation, Westinghouse Electric Supply Company, and Line Material Company.

PRODUCT NEWS

Butyl-Molding Technique Now Applied to Instrument Transformer

(800) General Electric Co., Schenectady 5, N. Y.



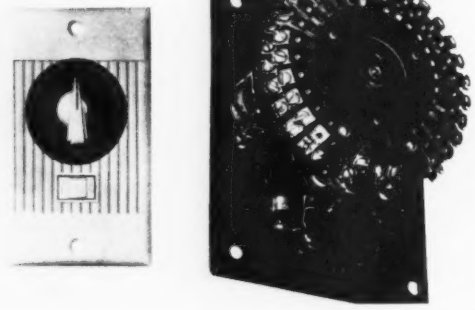
Successful application of the butyl-molding technique to manufacture of instrument transformers was announced recently. G-E's type JKM-3 is designed for accurate indoor metering and relay services and is rated 5,000 volts at 25-60 cycles; will be available with single primary in all preferred ratings, 10 to 800 amp.

Injected under high pressure into the areas around the core, coils and terminals, the butyl compound provides a homogeneous insulation that is resilient, oxidation-resisting, arc-resisting and highly resistant to moisture.

Both primary and secondary cells are shaped like figure eights for mechanical strength and high accuracy. This special coil construction and contact of the butyl with the windings is said to provide increased heat dissipation, which permits continuous operation up to 150% of rated load.

The core is formed of high-permeability steel strips interleaved for mechanical stability and accuracy.

Primary terminals are silverplated to reduce contact resistance; secondary terminals are of the solderless-clamp type. The transparent plastic terminal cover is so built that it cannot be put in place when the short-circuit switch is closed and devices are connected.



Switch for Selective and Master Control

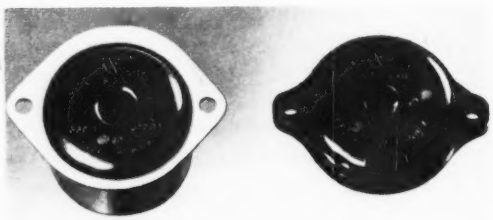
(801) Square D Co., P. O. Box 2115, Terminal Annex, Los Angeles 54, Calif.

This new selector switch (left above) may be used for selective as well as master control. Motor-driven master control contactor (right) was redesigned for the company's 24-volt system and does not require a special transformer. The selector switch consists of a multiple, rotating-type switch mounted on a single-gang switch plate and includes one single-station, lever-operated, off and on switch. Rotating member is a 2-circuit, 9-station, manually operated device. Master control contactor consists of two stationary contacting disks (each with 24 contact points) mounted on one frame. Movable contact arms are driven by one 24-volt, 60-cycle motor geared to 15 r.p.m.

Butt-On Type Slimline Lampholders

(802) Sylvania Electric Products, 500 Fifth Ave., New York 18, N. Y.

Developed for use with the 75-watt Slimline fluorescent lamp, this butt-on type lampholder set may be used also for the T6 and T8 size. It is available in black or white and has a small over-all size to fit the long, thin design of the lamp. The single-contact, high-voltage end has an internal spring mounting for easy insertion and removal of lamp, and to insure positive electrical contact. Electrical connection is made to a terminal screw contact in the opening at the back. The double-contact, low-voltage end is of terminal screw type also and has a grooved face. Underwriters' approved.



Here it is!

NEW BULLDOG
Service Electri-Center

Available in 2-, 4-, or 8-circuit cabinets, the handsome Service Electri-Center is ideal for homes, offices, and small plants.

featuring *Pushmatic*

THE BULLDOG Service Electri-Center, featuring *Pushmatic*, offers ease of installation, versatility and adaptability *never before obtainable in any panelboard.* Here's why—

More compact than old-fashioned load centers, the Service Electri-Center actually contains more wiring space! Revolutionary *Pushmatic* units are responsible for this bit of magic. Two-thirds the size of a pack of cigarettes, *Pushmatic* makes the Service Electri-Center a wireman's dream.

And complicated group mountings are eliminated. Each *Pushmatic* is an individual single-pole unit, making changes and additions a simple matter.

BullDog Service Electri-Centers don't have to be hidden away in the basement or other inconspicuous and inconvenient places. Beautifully styled, this modern panelboard is at home almost anywhere.

Available in 2-, 4-, and 8-circuit cabinets, the Service Electri-Center is the last word in efficiency and protection for homes, offices, and small plants. Send the coupon today for *Pushmatic* Bulletin No. 494. It contains complete information and prices on Service ELECTRI-CENTERS and the new *Pushmatics.*

Pushmatic . . . a new kind of control and protection

PUSH—It's ON!
PUSH—It's OFF!
PUSH—It's ON again!

THE revolutionary *Pushmatic* provides finger-tip control and automatic protection against short or overload. A simple push of the finger makes or breaks the circuit.

And if power is broken by short or overload, just push and service is restored. No more bothersome resetting by hand . . . no fuses to worry about. There's only one operation for this unique circuit breaker and that's PUSH!

There are four types of *Pushmatics:* THERMAL ONLY, THERMAL-MAGNETIC, or either of these types with AMBIENT COMPENSATING FEATURES. All *Pushmatics,* regardless of type or rating, are identical in size and contour and are interchangeable.

Approved by Underwriters' Laboratories, *Pushmatics* are available in ratings of 15, 20, 30, 40, and 50 amperes, 120 V., 1 pole, or 120-240 V., 2 poles, AC.

Send the coupon now for more information on why the sensational *Pushmatic* makes the BullDog Service Electri-Center the most modern panelboard available today.

BULLDOG ELECTRIC PRODUCTS COMPANY
DETROIT 32, MICHIGAN—FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION

BULLDOG ELECTRIC PRODUCTS CO.
Detroit 32, Michigan

Please send me your Bulletin No. 494 giving full information and prices on your *Pushmatic* Service ELECTRI-CENTERS.

Name_____

Company_____

Street Address_____ Zone_____

City and State_____

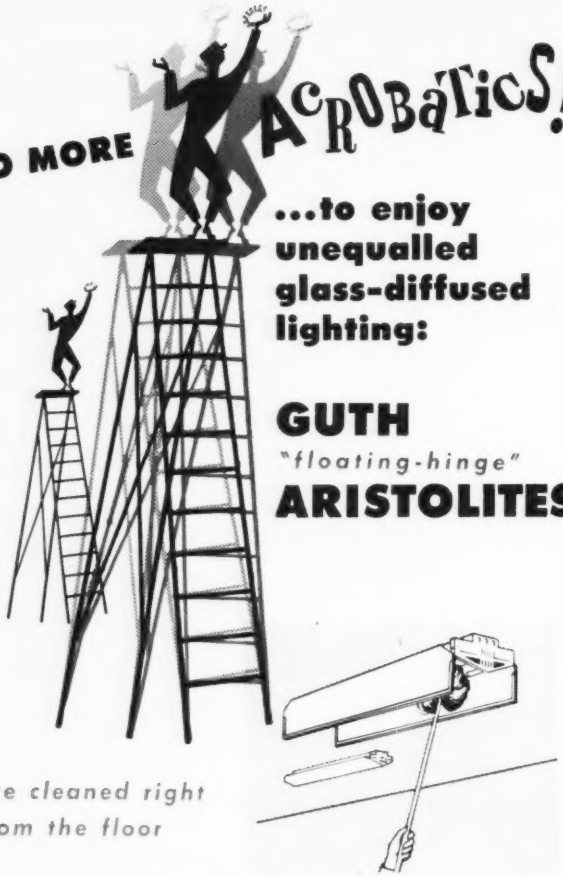
B

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

Coast Electric & Manufacturing Co.
1720 N.E. Sixth Avenue Tel. Garfield 2844
Portland 12, Oregon

Safety Switchboard Company
1445 Stevenson St. Tel. Hemlock 1-2470
San Francisco 3, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Logan 5-5331
Los Angeles 11, Calif.



NO MORE ACROBATICS!

...to enjoy unequalled glass-diffused lighting:

GUTH "floating-hinge" ARISTOLITES*

are cleaned right from the floor

Experts agree glass diffusion provides the finest reflected-glare-proof illumination, but costly cleaning was always a drawback... until GUTH pioneered the "floating-hinge" **ARISTOLITE.** Its glass panels swing open for economical *ladderless* dusting that makes its high efficiency easy to maintain.

Next time you want high intensities, better distribution, less glare and no shadows, use the unique "floating-hinge" **ARISTOLITE** ...the luminaire that makes better quality lighting *practical!*

• For full details of this years-ahead fixture, send for Bulletin 830-C from

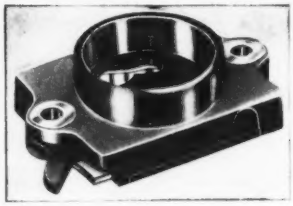
YOUR TEAMMATE IN *precision-planned* LIGHTING

Guth LIGHTING

THE EDWIN F. GUTH COMPANY / ST. LOUIS 3, MISSOURI

*● 876

Leaders in Lighting since 1902



Starter Socket is Time Saver

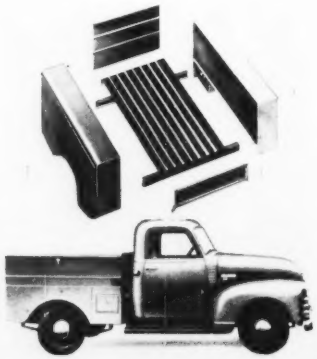
(804) Lloyd Products Co., 225 Chapman St., Providence, R. I.

This No. 450 remote starter socket is equipped with patented Cam-Loc terminals, said to cut down assembly time. The operator inserts the stripped wire leads and closes the cam levers, which fit flush with the molded casing. No screws or tools are needed. Inside electrical connection, according to the manufacturer, is instant, positive and rugged. In production is a matching lamp holder embodying the Flex-Loc design and equipped with the Cam-Loc terminals.

Packaged Service Truck Body

(805) Artisan Products Inc., 3490 W. 140th St., Cleveland, Ohio.

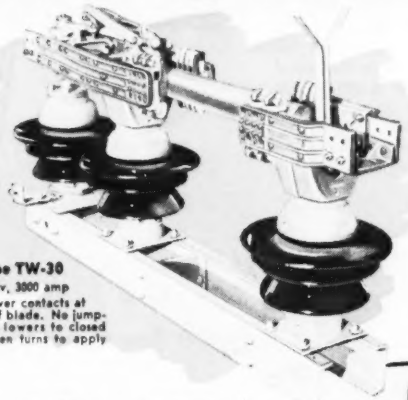
Designed for mounting on any late-model ½-ton chassis, less rear fenders, this model 60 KD knocked-down truck body comes in five assembled units. Average assembly time, according to the manufacturer, is four hours. One package includes right and left side compartments, completely assembled in units; front body panel drilled for bolting to right and left compartment units; tailgate with catches and hinges; corrugated pressed steel floor. Every body section is replaceable as a unit; optional extra equipment furnished with orginal purchase or later.



Outdoor High-Voltage SWITCHES

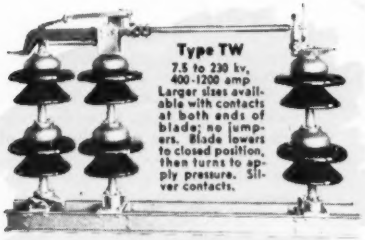
7.5 to 230 kv

Disconnecting, Sectionalizing, By-passing, Grounding



Type TW-30
7.5 to 34.5 kv, 3000 amp
Multiple silver contacts at both ends of blade. No jumpers. Blade lowers to closed position, then turns to apply pressure.

Type SW
7.5 to 34.5 kv, 400 and 600 amp
46 kv, 600 amp
Tilting insulator. Floating adjustable high-pressure roller silver contacts. Type SWA similar, but with two insulators per pole.



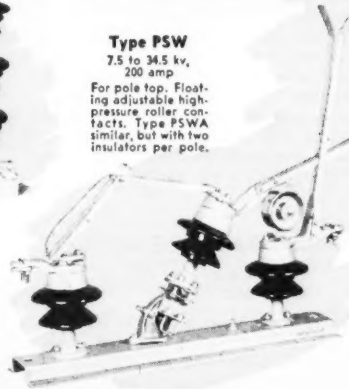
Type TW
7.5 to 230 kv, 400-1200 amp
Larger sizes available with contacts at both ends of blade; no jumpers. Blade lowers to closed position, then turns to apply pressure. Silver contacts.

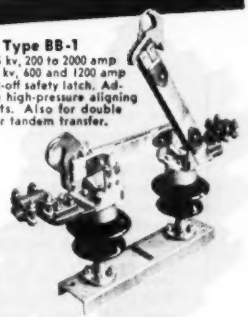
Easy to Install, Easy to Operate, Special Ice-breaking Features

Upright, vertical, or underhung mountings for three- or six-pole group operation (except Type BB-1).

Type YVW
46 to 115 kv, 600 and 1200 amp
For limited space. Two rotating insulators. Both half-blades swing to same side. Self-aligning silver contacts.

Type PSW
7.5 to 34.5 kv, 200 amp
For pole top. Floating adjustable high-pressure roller contacts. Type PSWA similar, but with two insulators per pole.





Type BB-1
7.5 to 34.5 kv, 200 to 2000 amp
46 and 69 kv, 600 and 1200 amp
Has pry-off safety latch. Adjustable high-pressure aligning contacts. Also for double throw or tandem transfer.

43 Years of Specialized Experience

For 43 years the Pacific Electric Mfg. Corporation has specialized in the design and manufacture of high-voltage switching equipment. Major types of air-break switches are shown here. Other outdoor equipment includes oil circuit breakers, fuse cutouts and bus fittings.

All through the years, repeat orders from power companies everywhere testify that this equipment is properly engineered for the job.

Switches shown are single-pole units for group-operation by mechanism, except Type BB-1 which is hook-operated. All outdoor type. Mounted on rigid bases for perfect alignment. Nonferrous current-carrying parts. NEMA and AIEE Adopted Standards.

Get All Facts . .

Call

PACIFIC ELECTRIC MFG. CORPORATION

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G. B. KIRKWOOD, 437 S. Hill St., Los Angeles 13, Calif.
KRIPPNER and POLLEY, 1 Denver St., Denver 9, Colo.
NORTHWEST SUPPLY CO., P. O. Box 268, Butte, Montana
KENT A. HAWLEY, 3304 Elgin Ave., Baltimore 16, Md.
WALTER I. FOSS, JR., 2306 Normil Dr., Bay City, Mich.
MYRON SWENDSEN, P. O. Box 156, Boise, Idaho
EDGAR F. HUBERT CO., 510 Statler Bldg., Boston 16, Mass.
BRUBECK ENGINEERING CO., 53 W. Jackson Blvd., Chicago 4, Ill.
C. C. MUSGROVE, 518 Southland Bldg. Annex, Dallas 1, Texas
SHAW HARDY CO., 825 Ingraham Bldg., Miami 32, Florida
L. C. HARDIE, P. O. Box 481, Des Moines 6, Iowa

Other Representatives in Principal Cities

GENERAL PURPOSE

Plugs and Receptacles

For Portable Electrical Equipment

An extensive line of plugs and receptacles with cast metal housings and round prong contacts of rugged construction to withstand hard use and abuse in industrial plants. Fusible and fuseless plugs provide circuit breaking and disconnect service. 1, 2, 3, 4, 5 and 6 pole types available in 30 amp. 125 Volt DC. 250 AC ratings. 60, 100 and 200 amp. ratings up to 600 volts for disconnect service. Also many special types for varied applications.

Consult your Pylet Catalog 1100, Bul. 1140-3, for complete listings.

CONDUIT FITTINGS • FLOODLIGHTS

SINCE 1897

THE PYLE-NATIONAL COMPANY

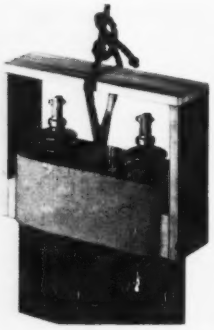
1364 N. Kostner Ave., Chicago 51, Ill.

Pacific Coast Sales Office
25 Beale Street, San Francisco 6, Calif.

Protective Packaging

(806) James R. Kearney Corp., St. Louis, Mo.

Protective packaging has been introduced by this company for its shunt capacitor. The wood protective bar also acts as a convenient carrying aid. A steel ring welded to the case gives the lineman a secure, accessible tie for raising the capacitor. Since the wood brace is easy to remove, it can be left on until the capacitor is ready to be bolted to the pole hanger, the manufacturer points out. Hand holes in the carton facilitate carrying.



All-Purpose Electrical Box

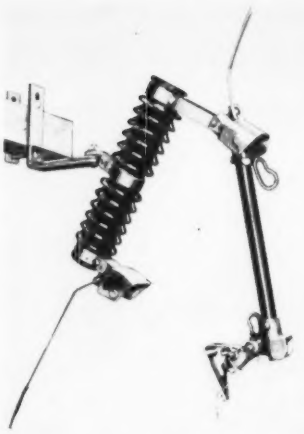
(807) All-Steel Equipment Inc., Aurora, Ill.

The RACO "Jay-Kay," recently introduced, is equipped with external clamps to conserve space inside the box. The box may be used with metallic or non-metallic cable and with pipe, the manufacturer states. For metallic cables, it has two bushed openings as required by Underwriters' to protect the conductors. To permit non-metallic cables to be gripped well back from the cut end of cable sheathing, a knock out entirely surrounds the bushed openings.

Porcelain Bushings, Giant-Size

(808) Locke Inc., Box 57, Baltimore, Md.

Porcelain bushings, said to be the largest cylindrical and petticoated bushings ever built, will become part of 230,000-volt switchgear units being manufactured by G-E for Pacific Gas and Electric Co. Each porcelain bushing has an inner diameter of 16 in. and outer diameter of 23 in. Height is 76 in. The switchgear units will be capable of interrupting an electrical current equivalent to 10,000,000 kva. in less than 1/20th of a second.



Dropout Fuse Cutout

(809) A. B. Chance Co., Centralia, Mo.

This new-type cutout indicates at a glance whether it has been opened as a disconnect or blown by fault. If the fuse tube of the new KM is hanging from the lower contact housing, it has been opened manually. If the fuse tube is hanging from the upper housing of the cutout, the fuse link has been blown. Pressure contact springs are protected by over-travel stops. A blast shield deflects gases and particles, protecting lineman at either side, manufacturer says.

(810) A-C CLAMP AMMETER AND VOLTMETER—Has five current ranges up to 1,000 amp., three voltage ranges up to 700 volts. Is designated as model 633, type VA-1 by its manufacturer, Weston Electrical Instrument Corp., 617 Frelinghuysen Ave., Newark 5, N. J.

(811) MAIN, RANGE AND LIGHTING CABINET—A new series of 4-, 6- and 8-plug fuse branch circuit cabinets. Wired in either series or parallel, main and range circuits are 60 amp. SafToFuse switches. Either standard or non-tamperable fuses may be used in the plug fusible lighting circuits. Made by BullDog Electric Products Co., Box 177, Roosevelt Park Annex, Detroit 32, Mich.

(812) PLASTIC ELECTRICAL TAPE—Polyken No. 822 has a dielectric strength of more than 10,000 volts; is claimed to have ten times more resistance to moisture than vinyl tapes. It is .009 in. thick; has tensile strength of 22 lb. per inch of width. Manufactured by Bauer & Black, Dept. F, 222 W. Adams St., Chicago, Ill.

(813) RECIRCULATING PUMP—Capable of pumping 7½ gal. per minute against a 2-ft. head, or 2½ gal. against 10-ft. head, is powered by a specially designed 1/35 hp. motor, an enclosed, shaded 2-pole type, operating on 115 volts, a-c, 60 cycles, 80 watts at 3,100 r.p.m. Made by Thermador Electrical Mfg. Co., Los Angeles 22, Calif.

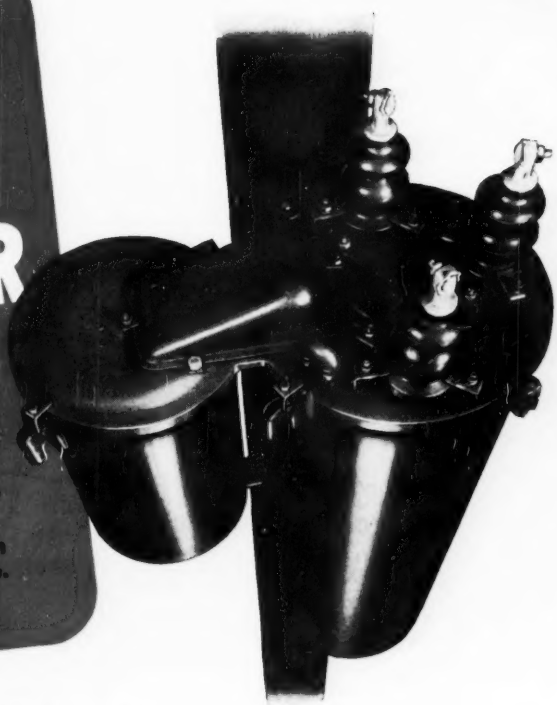
Announcing

ALLIS-CHALMERS 5/8% STEP

Pole-Type

VOLTAGE REGULATOR

- 20% Range of Regulation in 32 — 5/8% steps (10% Raise and Lower)
- Holds ± 1 volt band
- Costs but a few dollars per customer to install on average line
- Increases line and system capacity—boosts revenue.



A POSITIVE ANSWER to the Rural Low-Voltage Problem

HERE FOR THE FIRST TIME is a small economical unit for regulating (not just boosting) rural voltage.

Allis-Chalmers new pole type regulator is a fully automatic unit rated at 10.8 kva, 7200 v, 15 amp. Three years of field tests have proved its reliability.

The basic mechanism used in the new unit is the same time-tested design used in Allis-Chalmers station type single and three-phase regulators.

Ask an A-C engineer to determine the best means of improving voltage conditions on your rural lines using voltage regulators. Contact a nearby A-C Sales Office or send in the coupon.

ALLIS-CHALMERS

Originators of the 5/8 % Step Regulator

WRITE FOR LITERATURE

ALLIS-CHALMERS, 939A SO. 70 ST. MILWAUKEE, WIS.

☐ Send "When and Where to Apply Rural Voltage Regulators", Bulletin 6409.

☐ Have engineer call.

Name.....

Title.....

Company.....

Street.....

City..... State.....

A-2778

THE MAGNO-TRONIC FLUORESCENT STARTER

PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COSTS Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures.

GUARANTEED FOR ONE YEAR

The (SP-15-20) for use with either 15 or 20 watt lamps
The (SP-30-40) for use with either 30 or 40 watt lamps
The (SP-100) for use with 100 watt lamps

Ask for descriptive literature

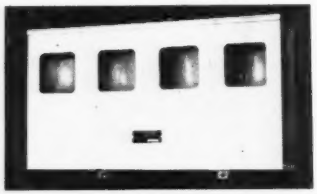
INDUSTRIAL ELECTRONICS CORP.

MAIN PLANT Newark 2, N. J.

OUTDOOR METER BOXES

Your first cost is last cost on MD's OUTDOOR METER ENCLOSURES. Sturdy galvannealed steel, dull aluminum finish, hubs that won't rust, loosen or leak, all practical knockouts and conveniences are built into every size, style and price range we produce.

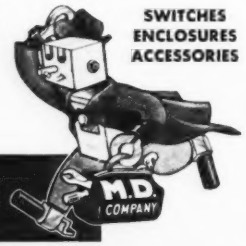
#7156
for single phase



#29155
with 4 Test Blocks

Makers of the famous Roto-Test Switch, designers and creative engineers who work with YOU on every electrical metering, devices or methods problem.

WESTERN SALES REPRESENTATIVES
FRED W. CARLSON, 307 Wall St., Seattle, Wash.
JOHN G. CORRIN, 600 S. Highland Ave., Los Angeles 36, Calif.



SWITCHES
ENCLOSURES
ACCESSORIES

METER DEVICES
COMPANY • CANTON, OHIO

For Additional Information

To secure manufacturer's literature to supplement the information in these briefs on products announced recently, check and return the coupon on page 50.

(814) A 3,000-WATT INCANDESCENT lamp to compete with arc lamps for spotlighting stage shows has been introduced by General Electric. The new spot produces an estimated 900,000 candlepower in properly designed equipment; is intended primarily for lighting the stage from distances of 75 to 150 ft.

(815) NEW RESTART CONTROL is designed to reclose automatically a motor starter after it has dropped out as result of a temporary power failure. Intended primarily for rural areas, with irrigation and oil field pump motor starters. Standard units are furnished for 115 or 220 volts, 60 cycles; on special order, can be supplied for 440 volts, 60 cycles and timing intervals to 5 minutes maximum. Made by Ward Leonard Electric Co., Mount Vernon, N. Y.

(816) PLASKON ALYKD, a polyester type resin compound has been adopted for use in molding bases and protective hoods for a new line of "RA" magnetic starters, announced by Arrow-Hart & Hegeman Electric Co., Hartford, Conn.

(817) A 100-AMP. RURAL RECLOSER with interrupting capacity of 1,000 to 4,000 amp. at 2,300 to 15,000 volts extends the range of ampere ratings available in the Westinghouse line. GR reclosers, including the new, 100-amp. size, are available for crossarm, direct-pole, or extended pole-bracket mounting. Additional details from Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Penn.

(818) TERMINAL BLOCKS adapted for color coded wiring are available from Curtis Development & Mfg. Co., Milwaukee 10, Wisc. Fiber marking tags are supplied for the type MT built-up terminal block in a choice of colors.

(819) A GLO-SWITCH to end fumbling in the dark and take the place of a night light has been announced by Slater Electric Co., Woodside, N. Y.

(820) A COLD CATHODE TUBE said to have a 10,000-hour life and a rating of 7,000 kelvin is in production by Luminad Corp., 152 Eighth Ave., San Diego, Calif. Installation cost, it is stated, will be approximately three times that of conventional cathode tube lighting.

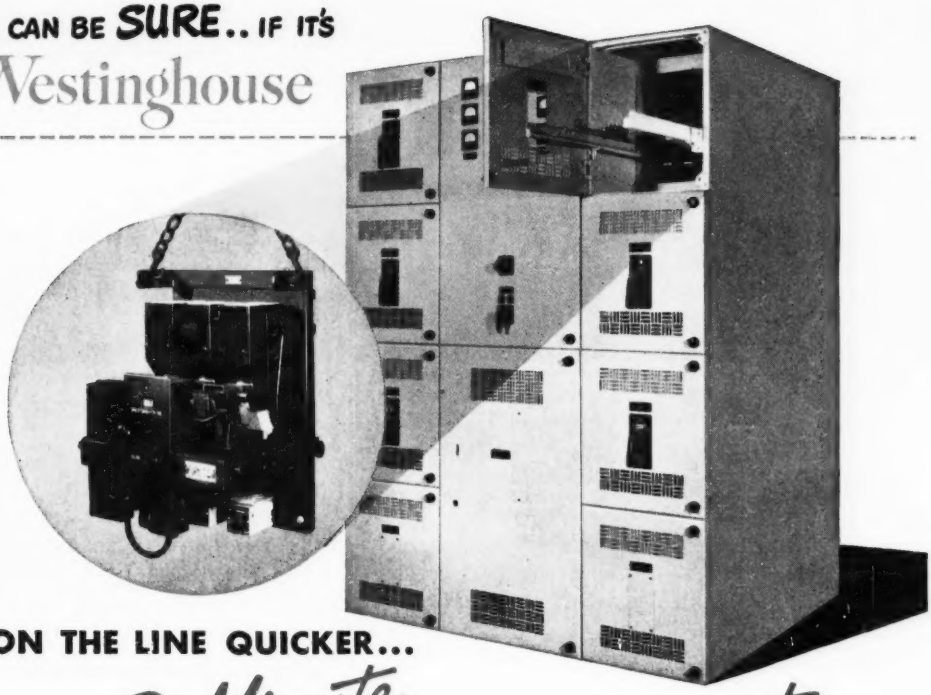
(821) A LIMIT SWITCH announced by Micro Switch, Freeport, Ill., is designed for an electrical rating of 20 amp., 110, 220, or 460 volts, a-c; $\frac{1}{2}$ amp., 115 volts, d-c; $\frac{1}{4}$ amp., 230 volts, d-c; $\frac{3}{4}$ hp., 110 volts, a-c; $1\frac{1}{2}$ hp., 220 volts a-c.

(822) A NEW ABRASIVE for cleaning and polishing metal consists of a fine-grain material held together by a flexible bond and molded in stick form; comes in five sizes from $\frac{3}{8}$x$\frac{1}{2}$x5 in. to 1x1x5 in. Made by Ideal Industries, 1042 Park Ave., Sycamore, Ill.

(823) FLUORESCENT LAMP CHANGER said to eliminate use of ladder has been introduced by Newman Mfg. Co., 205 Westport Road, Kansas City 2, Mo.

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



ON THE LINE QUICKER...

with 3-Minute Breaker Replacement

Westinghouse "*UNITIZED*" Low-Voltage Switchgear

"Unitized" drawout construction assures maximum continuity of service. Breakers are disconnected, inspected and replaced in a matter of minutes . . . getting units back "on the line" faster.

"De-ion" air circuit breakers perform repeated interruption without appreciable change of their operating characteristics. Drawout construction keeps inspection time to a minimum . . . makes it easier to keep breakers in good operating condition.

For all switchgear applications up to 600 volts, Westinghouse builds ten basic units that meet every requirement. This "Unitized" method of construction eliminates special design and engineering costs . . . yet, gives the flexibility of a custom-built installation.

Find out how "Unitized" low-voltage switchgear can improve your operation. Ask for your copy of Booklet B-2296-D. B-4067 also gives the complete story on the new DB Breaker, illustrated above. Get yours today from your Westinghouse representative, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-60713

Westinghouse

"UNITIZED"

LOW-VOLTAGE SWITCHGEAR

Made in the WEST.. for the WEST

Which of these 7

WILL GIVE YOU BEST ELECTRICAL CABLE

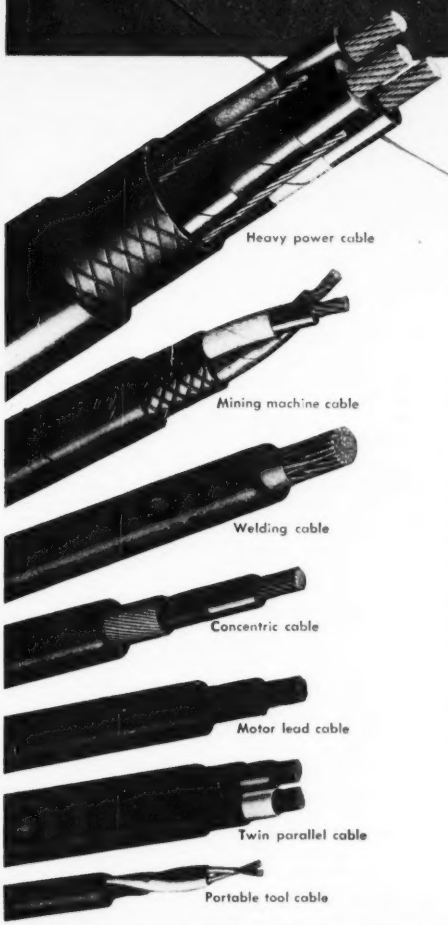
PROPERTIES AND TESTS		REPRESENTATIVE TEST VALUES FOR VARIOUS COMPOUNDS						
		AMARINE —40	AMERZONE —0	AMERZONE —B	AMARINE —RWS	AMERITE	AMPEROX	AMERPRENE
BASIC TYPE OF INSULATION		Natural Rubber	Oil-base	Butyl Rubber	Synthetic Rubber	Commercial 30%	Heat-Resistant	Polychloroprene
MAX. REC. COPPER TEMP.		60°C	75°C	80°C	75°C	60°C	75°C	80°C
ELECTRICAL CHARACTERISTICS	Dielectric Constant (Spec. Ind. Cap.)	4.0	4.0	4.0	4.5	4.5	4.5	....
	Ins. Res. (K)	50,000	7,500	40,000	30,000	30,000	20,000	100
	Dielec. strength in volts per mil	450	350	300	400	400	350	200
PHYSICAL PROPERTIES	Tensile Strength in lbs. per sq. in.	2000	600	700	950	1000 Synth. 1500 Nat.	1000 Synth. 1800 Nat.	2000
	Elongation in 2"	450%	300%	400%	450%	500%	500%	500%
	Permanent set	¼"	½"	⅜"	⅜"	¼"	¼"	¼"
ACCELERATED AGING	Type of test	Geer Oven	Geer Oven	Geer Oven	Oxygen Bomb	Geer Oven	Oxygen Bomb	Geer Oven
	Temperature	70°C	80°C	100°C	80°C	70°C	80°C	80°C
	Hours	288	168	672	168	504	336	168
	% Original Tensile Strength	70%	80%	80%	80%	85%	80%	90%
MOISTURE RESISTANCE	Gain in wt. after 7 days immersion at 70°C (Mg. per sq. in.)	25	....	20 or less	15 or less	35	35	30-60
	Capacity increase after 4 weeks immersion at room temperature	15%	15%	15%	10%	15%	15%	....
	Stability Factor 40-80 volts per mil 2 weeks at 50°C	.5%	1.5%	1.0%	.8%	2.0%	3.5%	....
SPECIAL PROPERTIES		High Voltage and Submarine use	Meets IPCEA ozone test	Withstands .03 conc. 10 hours	For hot and moist locations	General purpose rubber insulation	General purpose rubber insulation	Resistant to oil, flame and ozone

As the test data vary considerably with different sizes of conductor and thicknesses of insulation, these identical results can not be guaranteed throughout the whole range of sizes and voltage ratings. Some specific constructions will test higher and others will test lower than the listed values. However, the above table indicates in general what may be expected of these compounds.

AMERICAN STEEL & WIRE COMPANY

rubber compounds

PERFORMANCE AT THE LEAST COST?



THE proper selection of rubber compounds for electrical cable may mean the difference between long satisfactory service or frequent and costly shut-downs for repairs.

Some rubber compounds will stand more heat than others. Some can be used underground—others can't. The point to remember is this —*no one or two rubber compounds will meet all the conditions encountered in electrical cable operation.* That's why engineers and chemists at American Steel and Wire Company have perfected a wide variety of rubber compounds for different cable applications.

The right combination of compounds will assure better service from electrical cables at lower cost to you.

A GUIDE TO SELECT RUBBER COMPOUNDS

	SPECIFY
FOR UNDERGROUND OR UNDER WATER SERVICE—at high voltages, for all submarine power cables and for general use above 7,500 volts—	AMARINE—40
FOR OZONE-RESISTANCE—Amerzone-0 is an excellent oil-base compound. Amerzone-B is a butyl rubber compound that is highly resistant to heat and moisture as well as ozone.	AMERZONE
HOT OR DAMP LOCATIONS—Select a compound with high moisture resist... and high heat resistance.	AMARINE—RWS
GENERAL USE—For voltages up to 7,500 where copper temperatures do not exceed 60°C (140°F.), a performance type compound is satisfactory.	AMERITE
GENERAL USE with HEAT RESISTANCE—For voltages to 7,500 and where copper temperatures may run up to 75°C. (167°F.).	AMPEROX
FLEXIBLE JACKETS—Where resistance to oil, flame and sunlight is desired a compound containing Neoprene is recommended.	AMERPRENE

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Standard cable construction or special designs of cable are available from American Steel and Wire Company. We make the cable fit the job. This policy assures the longest cable life at lowest cost to the user.

USS

AMERCLAD CABLES

UNITED STATES STEEL

Buy
YOUR GENERATOR AND MOTOR BRUSHES
from a
SINGLE SOURCE

HERE'S WHY

Our organization develops and manufactures brushes from the raw material to the finished product. Although we carry standard items in stock, we also maintain a complete engineering staff to assist you in the selection and application of correct brushes for your equipment. We base our 30 years of reputable existence upon our SERVICE to INDUSTRY. Try Ohio for your brush requirements.

West Coast Representative
C. F. BOWERS
544 S. San Pedro St., Los Angeles, Cal.

THE OHIO CARBON CO.
12508 BEREA ROAD
CLEVELAND 11, OHIO

BULLETINS ETC.

(824) POCKET ENGINEER—Contains capacitor information on wallet-size card; answers three questions: how many kilovars, what power factor; how much voltage rise? Available from General Electric Apparatus Department, Schenectady 5, N.Y.; designated as GEN-22.

(825) SWITCH—A 4-page brochure on a newly developed type D front-operated enclosed switch designed for residental, commercial and farm applications is offered by Trumbull Electric Mfg. Co., Plainville, Conn. Designated Brochure TEC-1.

(826) CONNECTOR CHART—A desk-size Army-Navy connector specifications chart, with insert arrangements shown in detail at half scale for use by aircraft, radio, communication engineers, designers, maintenance men and purchasing agents. This 17x22-in. chart and a 38x50-in. full-scale chart are available from Cannon Electric Development Co., catalog department, 3209 Humboldt St., Los Angeles 31, Calif.

(827) MERCURY RELAYS—An improved line is described in bulletin 48 from Ebert Engineering & Mfg. Co., 185-09 Jamaica Ave., Hollis 7, Long Island, N.Y.

(828) INSULATION—A catalog of Fiberglas electrical insulating materials is available from Owens-Corning Fiberglas Corp., Textile Products division, 16 E. 56th St., New York 22, N.Y.

(829) OIL CIRCUIT BREAKERS—For outdoor use on a-c general distribution service where breakers of 50,000 and 100,000 kva. interrupting capacity are required; available in 2- and 3-pole models with maximum continuous current rating of 600 amp. at 7,500 volts for the class 50-OC-1 model and 15,000 volts for the class 50-OC-11 and 100-OC-11 models. Catalog 3640 with full data is available from Roller-Smith, Bethlehem Penn.

(830) DEVICES—A line of electric products, including lighting, radio and signaling transformers, ballasts, control transformers, solenoids, fuses, is described in bulletin 451-GB from Jefferson Electric Co., Bellwood, Ill.

(831) COATING—A temporary protective plastic coating for painted and enamelled surfaces is described in a folder from Spraylat Corp., 1 Park Ave., New York 16, N.Y.

(832) COUNTER—Photoelectric counter set P-1, designed for counting production moving along conveyor or feeding from output of automatic machines is described by Photoswitch Corp., 77 Broadway, Cambridge 42, Mass., in bulletin PA482.

(833) CABLE—NEasbestus wires and cables for installation where extreme heat, corrosive fumes and fire hazards are present, is described in catalog 509 by National Electric Product Corp., Chamber of Commerce Bldg., Pittsburgh 19, Penn.

(834) SWITCH—An improved centrifugal switch is described in bulletin 1001 available from Euclid Electric & Mfg. Co., Madison, Ohio.

(835) CONTROLS—Bulletin 100,000 on its line of electric control devices for industrial and commercial applications is offered by Ward Leonard Electric Co., 31 South St., Mount Vernon, N.Y.

(836) AERIAL CABLE—G-E's construction materials department has published a bulletin, entitled "Super Coronol Aerial Cable—Preassembled and Field Assembled." It includes a short discussion of what aerial cable is and where it should be used, but is devoted mainly to technical instructions concerning selection and installation and data on splicing and terminating. Available as GEA-5157 from General Electric Co., Bridgeport 2, Conn.

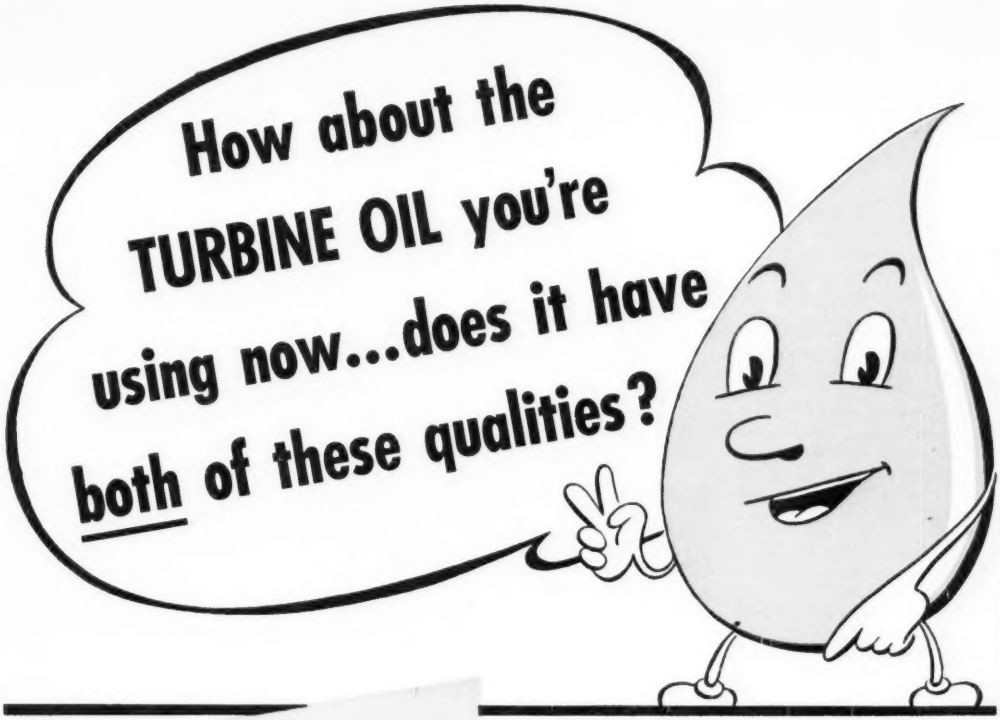
ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

800	801	802	803	804	805	806	807	808	809
810	811	812	813	814	815	816	817	818	819
820	821	822	823	824	825	826	827	828	829
830	831	832	833	834	835	836			

Name ..... Company* ..... Title* .....

Address .....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.



SHELL TURBO OIL

SHELL

● Ordinary oils are no match for either of the two worst enemies of turbine lubrication — sludge and rust. The ability to withstand those enemies is present only in oils custom-made for turbine lubrication.

SLUDGE RESISTANCE IN SHELL TURBO OIL — to make turbine oil, Shell selects only crude stocks which are naturally high in sludge resistance (oxidation stability). Then after special refining, Shell Turbo Oil is fortified with Shell-developed additives... to build up even greater resistance.

RUST RESISTANCE IN SHELL TURBO O' - comes from another compound developed by Shell. It is this agent which gives Shell Turbo Oil its exceptional metal-wetting ability and its tough, airtight film.

The care in manufacturing Shell Turbo Oil pays off for users. Case histories prove that. After *years* of service, no deterioration of the oil, no sludge nor rust anywhere in the oil system — that's the kind of performance this outstanding oil has delivered in installations of all types. Isn't that the kind of performance you want?

ELECTRA'S HUSBAND

"CHOKE that doubleplusungood prolefeed from the telescreen speedwise," I said to Electra the other evening when a particularly bad comedy program was blasting from the radio.

"Come again," Electra said looking up from the evening paper. "Are you crazy or are you just trying to be funny?"

"That was Newspeak, the official language of Ingsoc, which is the political philosophy of Oceania, one of the three great powers left in the world in 1984," I said, putting aside the book I had just finished reading.

"Now I know you had better consult a psychiatrist," Electra commented. "You've been acting queerly ever since you came back from that fishing trip."

"There's nothing queer about this," I continued. "I was going to astound you by being prophetic. Instead I'll just tell you enough about George Orwell's new book, *Nineteen Eighty-Four*,* so you'll maybe read it for yourself. It is the most savage and at the same time, effective attack on the collectivist system you'll ever read. Yet in exploding all of the high-sounding theories of statism, the book doesn't quote a statistic or make an appeal. It makes human degradation to the will of the state so real that anyone—idealist, politician or do-gooder—should think twice about the future and perhaps be converted."

"I don't expect to be alive 35 years from now so why should I worry?" she interrupted. "Besides you know I don't like fantasy."

"This is so real it will chill your blood and, while you may not live until 1984, a lot of things can happen in the meantime. If I'm not killed in the atomic war of the middle fifties, it's a certainty that I'll be thoroughly liquidated somewhere along the line by the collectivists. That's a sure fate for everyone who cherishes liberty and freedom.

"Orwell's book tells the story of life on Airstrip One, which is the name applied to the British Isles in 1984. London is but a shell of its former self, having been pounded by bombs from a continuing war between Oceania and Eurasia or Eastasia, the remaining two world powers. The spirit of living, of life itself, is exemplified by a face which stares at the populace from posters that are everywhere. The face reflects whatever emotion one feels—love, hate, kindliness, charity, suspicion. But the eyes are the chief feature—catlike, they cannot be evaded. Under the face is a slogan: 'Big Brother Is Watching You.' Big Brother is head of the Party—a power to be feared and a diety to be worshipped."

LOOKING FORWARD— LIFE ON STRIP ONE

"What about churches?" she interrupted again.

"There is no religion except Ingsoc," I answered. "The churches are either warehouses or museums. There are no spiritual or material values except those stemming from political power. Some of the developing trends of our times have been raised to standards of morality. Except for the Party elite, life is based on the doctrine of the herd: follow the leader, selflessly; be content with your lot; obey the slightest dictate of the state; have no thoughts except those supplied by the party; have no inner life or emotion that might detract from belief in and submission to the omnipotence of the state."

"Normal people won't do that," Electra mused.

"Almost all people will do anything under the power of fear, especially when this fear is based upon unspeakable torture that is both physical and mental," I continued. "You see when Ingsoc took over, it turned the technology, the enterprise and inventiveness of our society to its own ends, either destroying or diverting them. Technology and science were only permitted to operate in two fields—the production of the tools for war and in thought control. For instance television was perfected to a point where every room in every home and every office and public meeting place was equipped with a telescreen, a device which transmitted and received simultaneously. Thus almost every act of life was monitored by some party stooge who was aware of every movement, every gesture, every facial expression. Sounds, too, were transmitted back to some central headquarters. And microphones were hidden in unexpected places. The telescreen broadcast a continuous stream of government propaganda instructions and messages.

"But that was only half of the thought control program. In addition to 'doublethink,' which was expressed in such party slogans as 'War Is Peace,' 'Freedom Is Slavery,' and 'Ignorance Is Strength,' the party remade the language so that it would be impossible for people to encompass thoughts foreign to the welfare of the state. Disloyal thoughts were precluded; there were no words for them.

"But the crowning achievement of Ingsoc was its control over the past. Based upon the precept that whoever controls the past, controls the future, the Party continually rewrote history. All past records were corrected daily and hourly to conform to the policies, the programs and the accomplishments of today.

"But with complete and supreme power over everything the party could do more than this," I added. "The eroticism of sex was ruled out because it involved emotional reactions outside the reach of the state. Procreation was either loveless or asexual."

"H'mmm, but they couldn't do that," Electra said. "In fact I can't believe that, with people as enlightened as they are today, any of these things could ever happen."

"Dear girl, don't delude yourself," just consider the scientific atrocities of the Nazi authoritarians with their efforts at thought control. Think over the ruthless liquidations of the Communist overlords. Review austerity and self-denial of England with little or no popular outcry. Remember how far we have gone in America since 1932 in our dependence upon government."

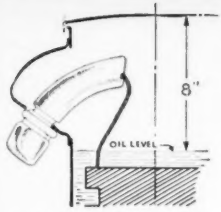
"Maybe I had better read Orwell's book," Electra said.

"It would be a good thing," I concluded. And to myself, thought, "you and several million others."

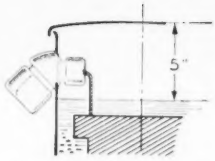
*Nineteen Eighty-Four by George Orwell. Published by Harcourt Brace & Co., New York.

NOW...

- *Tank Height Reduced!*
- *Bushing Pockets Eliminated!*
- *Bushing Clamp Simplified!*



OLD DESIGN required more space above oil level because of longer bushing shank.



NEW BUSHING saves up to 3" in tank height . . . eliminates need for bushing pockets.

EXPLODED VIEW shows the simplicity of the new bushing clamping arrangement.

A-2704

. . . on Allis-Chalmers Distribution Transformers

ALLIS-CHALMERS NEW TANK-WALL BUSHING eliminates all need for high voltage bushing pockets . . . enables up to 3" reductions in tank height. This means even greater compactness . . . easier handling distribution transformers than ever before! (Reductions are *in addition* to savings in size and weight through use of highly oriented core steel.)

Installation of the bushing itself is simplified because there are fewer parts, and no critical porcelain tolerances between bushing and keeper. A cushion-like spring on the inner side of the tank wall, between the keeper and bushing absorbs any shock or strain during handling. Increased wall thickness of the bushing, together with straighter, shorter shank contour, increases mechanical strength.

AVAILABLE ON UNITS UP TO 150 KVA

The new design is available on transformers from 3 to 100 kva, single phase, and from 9 to 150 kva, three phase, in voltages up to 4800/8320Y.

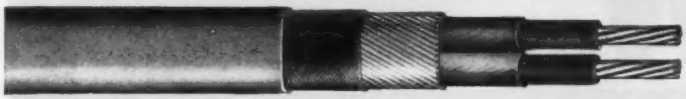
For further details on this new bushing, or for other facts on Allis-Chalmers quality distribution transformers, call your nearby A-C sales representative.

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment from Generation through Utilization

Rome's *IMPROVED* SERVICE CABLES



GIVE YOU MANY PRACTICAL ADVANTAGES *AT NO EXTRA COST*

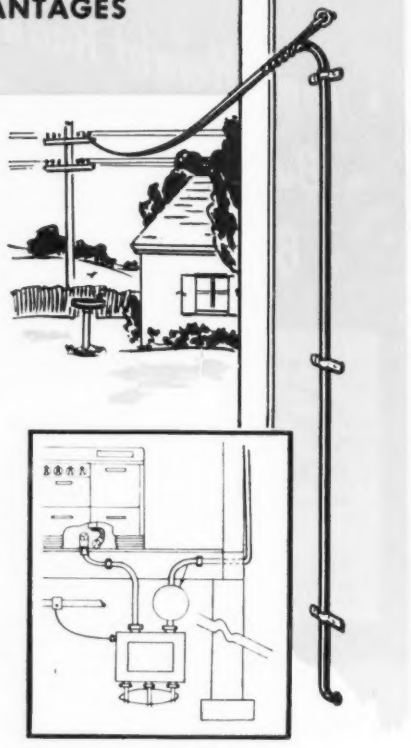
Yes, Rome's improved Service Entrance (Type SE) and Service Drop (Type SD) Cables are now constructed to provide many desirable features for this class of service . . . *at no extra cost.*

For one thing, an improved interlocking braid is applied over the rubber insulated conductors. There is a new, clean inner construction providing easy identification of color-coded conductors and a brightly tinned concentric conductor for easy connections. Wrapped over the concentric is a special moisture-resistant tape, making an effective "water seal" against atmospheric moisture. Further, the conventional outer braid of cotton has been replaced with a non-rotting and non-wicking combination of glass and presaturated yarns. Finally, the non-marring, moisture and flame-retarding gray paint finish can be repainted to match any color desired.

Here, then, is a Service Cable that is non-fraying and non-festooning for longer life and neater appearance . . . is non-wicking and sealed against moisture . . . is clean and easy to handle . . . has improved edgewise bending because the new construction permits conductors to slide easily.

Rome Service Drop (Type SD) and Service Entrance (Type SE) Cables are fully approved by Underwriters' Laboratories, Inc. Further, under conditions of the National Electrical Code, Service Entrance (Type SE) may be used as a single cable directly from pole to meter—as well as for electric range and domestic water heater feeder services. Thus, there is the added advantage of a *single* cable for complete service entrance.

It will pay you to make sure that your next Service Cable requirements are filled by Rome Cable. You are assured of high quality workmanship predicated upon sound engineering. Available in two and three conductor constructions.



FROM POLE TO METER . . . TO RANGE OUTLET . . . WITH SERVICE ENTRANCE—TYPE SE, STYLE U

It costs no more to buy the best . . . Specify Rome Cable

FROM BAR TO FINISHED WIRE

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SEATTLE 4, WASH.
3404 Fourth Ave., So.

AUGUST 1949 Vol. 103, No. 2

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

The $$$ of Good Industrial Relations

R. G. Kenyon*

Vice-president, Southern California Edison Co.

THE largest single item of expense which must be met by most industry today is the cost of human energy and human ingenuity. Management must continuously study and keep aware of the price it is paying for this human energy and human ingenuity. In this work, an industrial relations department is vitally concerned.

An industrial relations department should help to make every pay roll dollar as effective and profitable as possible. A well-lubricated engine runs smoothly and has a longer life than one which is operated without sufficient oil. A well-operated industrial relations organization can furnish the lubricant for a business that will tend toward greater production per human unit. Just how much a good lubricating job is worth to a business must be determined by the simple fact of how much it contributes to the net worth of the business itself. The break-even point in industrial relations means the point at which the cost to lubricate equals the increase in net worth.

A business leader must take the position that his first duty is to his enterprise and to the maintenance of the solvency of that enterprise. He can have no other choice. My hope is that I can leave with you the concept that an industrial relations department is not just merely a scenic gadget attached to the business structure, but is an essential factor in the building of success for the business.

In our approach to the problem of making our industrial relations department assist in the building of net for our company, we have become convinced that the essence of the entire problem is the thing which we know as employee attitude. In the old days an employment contract covered practically everything. Today it just gets someone on the pay roll, gets him nicely settled, then the struggle for position begins. A new attitude toward the job, a new attitude toward the boss, and a new attitude toward the government have grown up together in the last sixteen years. Let us examine them just for a minute to see what has happened. First, what is the present-day attitude of a worker toward his job? Does he still have the craftsman's pride in accomplishment? I don't believe you can say that this is universally true. There are just enough cases of the slovenly, I-don't-care-what-happens type of working attitudes to dilute the entire business structure.

Why our present-day workers have acquired such an attitude toward the job is difficult to say. Some believe that it coincides with the rise in unionism. Some ascribe it to the breakdown of moral fiber brought on by two world wars in one generation, and others have various reasons which they are willing to advance for this attitude toward the job.

The production line technique has undoubtedly contributed measurably to the workman's loss of pride in accomplishment. If all you ever see of any process is a small screw which you fasten to the side of a cover plate on an engine as it crawls slowly by you on the production line, it is difficult to develop any great pride in the final product itself. The team is too big. When the man has lost his ability to have pride in the final product, then practically all of the so-called "job satisfactions" have disappeared, and all he has left is the paycheck, and shorter and shorter hours. The natural, normal tendency is then to look toward his union to get the paycheck increased and the hours shortened.

Well, the production line technique is apparently essential to our industrial success and it cannot be abolished, so we are brought to the necessity of providing substitute satisfactions to these workers. Western Electric has experimented with this at its Hawthorne plant. The final conclusion reached by those in charge of these studies was that production increased when workers felt the attention of management focused upon them. Many companies are taking a cue from these Western Electric studies and attempting to increase job interest and job results by showing some personal interest in the individual workers. It sounds so simple that you wonder why we have not been able to just chart out a course of procedure and then follow it.

The attitude of the worker toward the boss has also very definitely changed. Once upon a time, the worker knew the boss; that is, he knew the big boss, the owner. Today, size alone has made it impossible for the big boss to know all his men, or for the men to know him. There are just too many. So business has had to depend on the personnel sense of the local foremen and local supervision to translate management and its policies to the employees. In some cases this has worked out well. In others it has developed some vicious feuding, and has shown clearly the urgent need of help for some of the local supervisors in the handling of their personnel problems.

I have indicated that the new attitude of our workers toward government has significance when we attempt to locate the break-even point in industrial relations. For more than sixteen years now, various and sundry demagogues in administrative high places have preached the policy, "lean on the government in all your troubles." This ideology has taken root in a big way. In fact, it will be found that not only has the working man fallen for it, but some fairly substantial business men have lined up with the "something-for-nothing" fallacies of the New Deal.

Take social security. There is no question about it but that this is a

* Based upon an address before the Pacific Coast Electrical Assn., Coronado, May 25-27, 1949.

If our workers believe us, if they can be made to understand that there is nothing magic about success in business, if they can be made to believe that they as individuals have an obligation to bring to their work stations all the energy and all the ability which they possess, then and only then will the break-even point in industrial relations maintain itself at a place where everybody will profit

socializing procedure, the concept being that if you do not take care of yourself and make yourself ready for your retirement years, that there is an obligation on the part of someone else to see to it that after you have retired from active working life, you have sufficient bread and beans. The fact that the "someone" is conveniently labeled "government" is apt to cloud our thinking a bit, because in the last analysis, government is, as we all know, nothing but *us* with a few elected or appointed hired workers.

May I digress just a minute to enlarge a little bit on my reference to the social security fallacy in which we are all immersed. It is impossible for you or for me or for any member of our governmental staffs to say to any individual worker at the age of 35, "Your personal habits are such that when you reach 65 you are not going to have enough money to live on." You can just imagine what he would say to you. But under our present socialized thinking we say, "ah, but that poor fellow when he reaches 65 must not be allowed to just *exist*. He *must* have some social security to help him over the bumps."

So we find the worker pretty thoroughly conditioned to expect (1) that he works too hard and gets too little, and (2) that the boss is a great big money-mad ogre without one single attribute of humanity in his entire make-up, and (3) that there is no reason for the worker to worry because a beneficent government stands ready with the necessary security to safeguard him from any unpleasant facts of life, including his own iniquities.

So we agree there has been a change in attitude. So we concur in the thinking that conditions outside of our normal work conditions or industrial conditions have contributed to this change, and that such outside conditions still prevail. Therefore we have two courses of action which we might take: (1) we can sit down and cry in our beer and wait for the deluge, or (2) we can attempt to reach the thinking of the individual men and women in our working organizations with some counteracting material. Now this is a very difficult program to attempt to put over, because it is essential that the individual be convinced that the immediate benefits which he might derive from these socializing processes are going to cost him more in the long run than if he were to insist that every tub stand on its own bottom, and that he be rewarded because of his own production record and not just because he was born.

There is need for some kind of active work to create the impression in the minds of our employees (1) that they are important, (2) that we like them and need them, and (3) that we are vitally interested in their welfare and that their welfare coincides directly with the welfare of the enterprise. Just a little over a year and a half ago we decided that some system for reaching our employees should be developed.

Our supervisors have about a twenty-minute speech which they can actually make. However, they invite interruption. They hope they will not be allowed to finish the speech. They hope there will be questions on questions, and they mean to develop the thing into a good interchange conference meeting. Some of the meetings last an hour and a half, some last two hours and a half. The leader carries it just as long as he thinks it is valuable.

Basically, the conference leader has three objectives: (1) he wants to create the impression in the mind of each individual around the table that he, that individual, has the best possible job that he could hold at this stage in his life; and that (2) he has the best possible job with the finest company with which he could be affiliated, and (3) if he wants to make progress in that good job with that finest company, there is just one direction in which he can look, and that is directly toward his own boss. Why should a man look anywhere else? The follow-up on these meetings has been extremely interesting. I have received phone calls and notes from various supervisors, indicating that they have never before had the number of questions or the number of employees in to just talk with them about this or that—indicating, at any rate, that we have reopened some of the doors and stimulated some employees to make renewed contact with their boss. We believe that this is a healthy activity and one which we can use to our real advantage.

The questions asked are very interesting. We find that, as these men go around the system, many of the questions are duplicated, indicating that while geography may separate us, the problems are common to all.

When attempting to devise means and methods of improving employee attitudes, a business man dare not allow the sob sister surges so rampant today to confuse his thinking. I say that the basic obligation which management has to the business and to the employees and to the customer group is the obligation to maintain the business in a healthy condition.

Let us take a look at conditions. In the good old days when we hired a man we paid him so much money for so many hours of work. Today we still pay him for his work, but in addition, all of us now have paid vacations, paid holidays—minimum of six, some as many as nine, ten, or eleven—sick leaves with pay, and in some cases, elaborate provisions for care either from sickness or accident, industrial or non-industrial. We have come to the five-day week. Insurance plans in whole or partially company-supported have developed. Many companies have added to their list of so-called fringe benefits, pensions, some of them pretty generous pensions.

We have come a long way in the socialistic type of thinking in our relationship with our employees. We have assumed many of the responsibilities for the ultimate welfare of the individual that at one time was considered the worker's individual responsibility. I know that many people on our side of the table have arrived at the conclusion that there is an obligation on the part of industry to "look after" its employees, to safeguard them from the hardships and vicissitudes of life. Intelligent handling of the manpower on our pay rolls is the real answer to the problem of how to keep the break-even point in industrial relations low enough so that we may perpetuate our individual businesses and our national economy. If our workers believe us, if our workers can be made to understand that there is nothing magic about success in business, if the workers can be made to believe that they as individuals have an obligation to bring to their work stations all the energy and all the ability which they possess, then and only then will the break-even point in business maintain itself at a place where everybody profits.

THE FARMER AND CVP POWER

Edson Abel*

California Farm Bureau Federation

THE California Farm Bureau Federation was organized and is maintained for the purpose, among other things, of representing, protecting, and advancing the social and economic interests of its members, and interests of farmers generally in the state of California. The public utilities department is one of the service departments maintained by the federation for the achievement of these objectives, and its personnel has been engaged for over 25 years in obtaining power, telephone, water, and transportation services for its members and other farmers of California at the lowest possible lawful rates.

The interest of my organization arises from the fact that over 9,000 Farm Bureau families carry on their farming operations within the five counties of Fresno, Madera, Kings, Tulare, and Kern, which, roughly speaking, comprise the area the relief of which is supposed to be the primary objective of the Central Valley project. I say "supposed" because there have been many things happen which create doubt that this objective still retains its original status so far as the construction agency is concerned. The interminable delays which have characterized the construction of the irrigation features and the absence of any indication of a change in policy have dimmed the hope of immediate relief. Virtually all of these 9,000 farm families are vitally concerned in early access to supplemental water supplies as in all too many cases, their very existence is contingent on speedy relief.

The five-county area mentioned needs water and needs it desperately. The unprecedented drought of last year aggravated a situation which had already progressed beyond the critical stage. The need for water to take the place of the usual rains caused still larger draughts upon water supplies already receding beyond economic pumping lifts. This year the snowpack in the Sierras east of the San Joaquin Valley is considerably better than it was last year but the rainfall situation in the valley is worse.

This drought situation has been recognized, seized and dilated upon by the publicity agents of the Bureau of Reclamation for its own purposes but so far there has been no indication of any effort by the bureau to accelerate its irrigation construction program to take care of this urgent need. This easily could be accomplished. The irrigation facilities still to be constructed readily lend themselves to sectionalization. Congress has always supplied ample funds as is shown by the fact that from April 8, 1935 to June 30, 1947, the average annual unexpended balance of appropriations to the Bureau of Reclamation for the Central Valley project was over $12,000,000. The only thing lacking apparently is inclination on the part of the Bureau of Reclamation to hasten the actual delivery of irrigation water.

In its justification to the Congress in 1944, the Bureau of Reclamation said the Friant-Kern canal could be constructed in two years. This work started in September 1945, and here nearly four years later, it is not yet half done. There are over 40 miles of this ditch untouched and the bureau has announced that it will not ask for any bids on this last stretch until December 1949. This new statement is to be contrasted with its statement on March 4, 1947, at the hearings before the House committee that this canal would be completed in 1949.

The story on the Delta-Mendota canal is a similar one of dawdling and dilly-dallying. This is one of the key units in the project. Commissioner of Reclamation Straus told the Senate Committee on Appropriations in 1947 that the Delta-Mendota canal had to be finished and in operation before any water could be delivered from the Friant-Kern canal. As of the first of this year, the canal was only 20% completed. The Delta Cross Channel is the conduit through which Shasta water is to be conveyed from the Sacramento River across the Delta to the Tracy pumps; thence to be lifted to the Delta-Mendota canal. It is an essential unit in the plans. All of the estimates of the Bureau of Reclamation for construction time on this unit say that four years will be required to complete it. As of now, they haven't even started on its construction.

It was this dilatory construction record that caused the adoption over a year ago of a policy resolution by my organization which I now offer for the committee's consideration. It was adopted by the state delegates from the 51 counties comprising the California Farm Bureau Federation at the annual meeting in November of 1947. Voting on all resolutions of this nature is by the delegate body composed of farmers elected by the 51 county farm bureaus, one from each county organization. This resolution reads as follows:

"COMPLETION OF CENTRAL VALLEY PROJECT

"The Central Valley project had its inception in the increasing and critical shortage of water for irrigation in the San Joaquin Valley. This project has been under construction since 1935 and present plans of the Bureau of Reclamation do not include the delivery of any water for irrigation in the areas of critical shortages until 1952. The hydroelectric power features of the project for the purpose of financially aiding and assisting the other purposes of the project.

"We insist that the long and unduly delayed delivery of irrigation water in the Central Valleys be expedited beyond the present program and to the greatest possible extent and that other authorized federal water-conservation and flood-control projects in the Central Valleys be completed at the earliest practicable date.

"Irrigation is the primary objective of the Central Valley project and the basic law authorizes the inclusion in the project of hydroelectric power facilities for the purpose of financially aiding the project.

"We oppose the expenditure of any funds for the construction of electric-power facilities which will reduce the financial aid to the project which can be derived from hydroelectric power developments."

As stated in the resolution, the Central Valley project is the solution developed by California after many years of study to alleviate the critical water shortage of the southern San Joaquin Valley.

The responsibility for the construction of this great project was enthusiastically assumed by the Bureau of Reclamation in 1935. It has been at the job ever since that time and has had all the money it could spend, but aside from limited deliveries of water to Madera and Contra Costa counties, the extensive agricultural developments for whose sake the project was originally conceived have as yet received no water. And what is more, a tally of

* Extracts from testimony before the Subcommittee on Interior Department Appropriations, Committee on Appropriations, United States Senate.

the actual construction record, as of February 1949, shows that the strictly irrigation features, viewed as a whole, are less than one-third done. These are shocking and disheartening facts to irrigators who have placed their faith in their government.

Drastic Remedies Demanded

Under these circumstances, it is our position today that the situation demands drastic remedies. With that in mind it is our plea that generous appropriations should be made for the completion of the irrigation and power generation features of the Central Valley project and that no money at all be provided for transmission lines and facilities, at least until the project's irrigation obligations are being satisfied. Our reasons for that recommendation are:

1. The Bureau of Reclamation has shown it has neither the inclination nor the ability to press with the required vigor more than one phase of this project at a time.

2. With only the slightest encouragement it will, more than ever, concentrate its attention on the commercial power system which it is seeking to establish and will neglect the primary purpose of the project—irrigation.

3. The present method of disposing of Shasta power is bringing in more net revenue to the project than any other method suggested but if the bureau is permitted to establish its commercial power system, the solvency of the project will be in serious jeopardy.

4. The continuance of the present method of disposing of Shasta power will not only assure the solvency of the project but will also permit power revenues to carry out their lawful assignment of financially aiding the project.

In support of the first thesis, we have only to point to the dismal construction record so far made to which we have already alluded, and to the known gloomy prospects for the future. The bureau has been dividing its attentions in the past between irrigation and power, with the latter receiving the major consideration. The record discloses the result.

The second thesis also is sustained by the record. The Bureau of Reclamation has been so obsessed with the creation of a government-owned commercial power system operated by the Bureau of Reclamation that it has diverted to that objective all of the funds and attention it was possible to so apply. That has been the major objective of the bureau in connection with the Central Valley project virtually ever since it took over the project. It has never needed any appropriations to spend a large amount of its time and overhead on its power pet. It has even defied Congress and used funds supplied for other purposes for the building of transmission lines. During this period, it has also compiled its record of dawdling and dilly-dallying in the construction of the irrigation features.

The irrigators are being forced to pay dearly because of a bureaucratic obsession and are faced with mounting penalties unless the Congress takes the necessary action. It is a foregone conclusion, based on experience, that the irrigation phases of the project will receive less attention than ever if Congress fails to confine the Bureau of Reclamation to its proper channels of activity. The most detrimental action that could be taken, so far as the irrigation phases of the project are concerned, would be to appropriate funds for the Central Valley project without specific allocations. That would discount in toto all of the promises made by the bureau as to completion of the irrigation features.

With all due respect to the House of Representatives, it took the action best calculated to encourage further delays in the construction of these irrigation features. We do not quarrel with the amount of money but it was appropriated to the Bureau of Reclamation for the Central Valley project in a lump sum which is tantamount, in the light of the record, to a green light on all of its commercial power system aspirations. Under that arrangement, irrigation will get short shift indeed.

Turning to the third thesis, the arrangement under which Shasta power is now being disposed of is bringing in, and will result in, more net revenue than any other proposed method of handling. The purpose of the inclusion of the transmission lines, in the first instance, was to assure a satisfactory selling price for Shasta power. They were intended to be a club to persuade power purchasers to pay fair prices. We would be the last to suggest that this club be discarded. The potentiality of these transmission lines has done a very fine job because they have caused the present purchasers to pay a price which gives the project more net revenue than it would receive under any other proposal so far made. And the Bureau of Reclamation wants to throw that revenue in the ash can because it conflicts with its commercial power system.

It has a demand and energy rate of a postage-stamp character at which it offers to deliver power f.o.b. any point in an area approximately 250 miles square. This is the rate at which the power is now being sold to the private utility at Shasta substation, a point about 25 miles from Shasta Dam. The Bureau of Reclamation is violently opposed to this arrangement and has proposed to the Congress that it be given millions of dollars for the construction of transmission facilities so that it can obtain, 200 miles and $77,000,000 away from Shasta substation, the identical gross price per kilowatt-hour it is receiving now at Shasta substation, in entire disregard of additional costs of investment, operation, and maintenance and very substantial and unavoidable transmission losses.

The bureau stands all of these charges in order to sell the energy 200 miles and $77,000,000 farther away, at the identical gross price per kilowatt-hour it now receives and can get in the proximity of Shasta Dam. It is a most fantastic proposal, violative of every principle of economy and sound business. Only an obsessed bureaucracy with unlimited access to a public treasury would consider it.

We have lately heard that the voice of economy is becoming louder in the halls of Congress. This is a rare opportunity for that voice to be heard and one in which the difference between economy and abject squandermania could not be more strongly highlighted. The bureau's program is simply a case of spending more millions so as to make absolutely sure of getting less revenue.

Proposed Price Too Low

Furthermore, sight cannot be lost of the fact that the additional salable power made available by the proposed steam plant cannot be produced for the price at which the bureau proposes to sell it. The proposed unit is mainly for stand-by of firming service and it cannot be used to any great extent except to fill out the demands on Shasta power. Compared with its capacity, its actual production of salable energy will be relatively small. In other words, the cost of fuel for that plant will make the small amount of power it produces so costly that the rest of the power operations will have to subsidize its production.

There is another aspect of this matter which demands attention. The Bureau of Reclamation proposes to set up and operate a government-owned and bureaucratically operated electric power system. This system will have for disposal to the consuming public the power generated from an installed capacity of approximately 460,000 kw. When in operation, this will be roughly about one-sixth of the serviceable capacity of the competing privately owned power company which serves the Central Valleys of California. The energy from the government-owned facilities will be sold, according to Ben W. Creim, regional power man-

ager of the bureau at Sacramento (see hearings, fiscal year 1947, p. 319, Feb. 19, 1946), at a rate which will save the favored consumers "some $2,500,000 per year on their power bills." In other words, approximately one-sixth of the power consumers in the Central Valleys area are to be selected by the Bureau of Reclamation as the recipients of an annual governmental beneficence of $2,500,000 while the other five-sixths will be left to obtain their service from the privately owned utilities and through them and otherwise will pay taxes to support the gratuities showered on its personal selectees.

Perhaps to avoid this rank favoritism to those selected by the bureau to be the recipients of governmental beneficence, this government is prepared to go further into the power business and put all consumers in the areas involved on the same preferred basis. Otherwise, what answer can there be to this unexampled generosity to only a selected few of a given class.

With reference to the fourth thesis that, if the present revenues are continued without diminution, the irrigators could be given water at substantially lower rates than are now proposed, a little background is necessary for a complete understanding of the proposition.

The rates for irrigation water now offered by the Bureau of Reclamation to Central Valley project irrigators are $3.50 per acre-foot for class I water and $1.50 for class II water. The latter is not firm water and is available only occasionally. Both of these prices are canalside and the irrigators must take the water there and pay the additional expense involved in conducting the water from the canalside to its place of use on the land. This additional cost varies from $1 to $5 or more per acre-foot. Thus, at the place of actual use, it is far from cheap water. In fact, with a few exceptions, it is probably the most expensive water available to California agriculture.

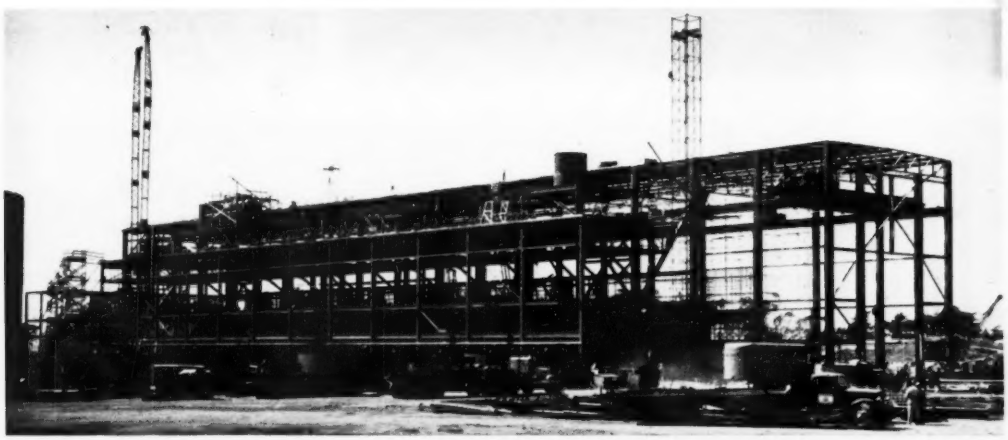
The $3.50 per acre-foot figure was arrived at by the Bureau of Reclamation after an exhaustive study by it of the irrigator's ability to pay and represents the maximum which the bureau thought the irrigator could afford. The figure has been seriously criticized as not including items of expense customarily paid by irrigators but its major defect lies in the fact that this ability to pay was calculated on 1939-44 farm prices. One does not have to be an economist to know that the average prices prevailing on all agricultural commodities during that period were more or less inflated and could not possibly serve as any sound basis for the calculation of ability to pay in any more normal period. The bureau, in its report to the Congress (H. Doc. 146, 80th Cong., 1st sess., pp 21 and 22), concedes that $3.50 per acre-foot is a maximum figure and admits the probability that a lesser figure will more closely approximate the actual ability of the irrigators to pay.

In passing, it is interesting to note that under the bureau's program the irrigators whose relief was supposed to be the original and primary purpose of the project, are to be required to pay to the maximum of their ability while the power users are to financially aid the project by getting their electricity at the lowest possible cost.

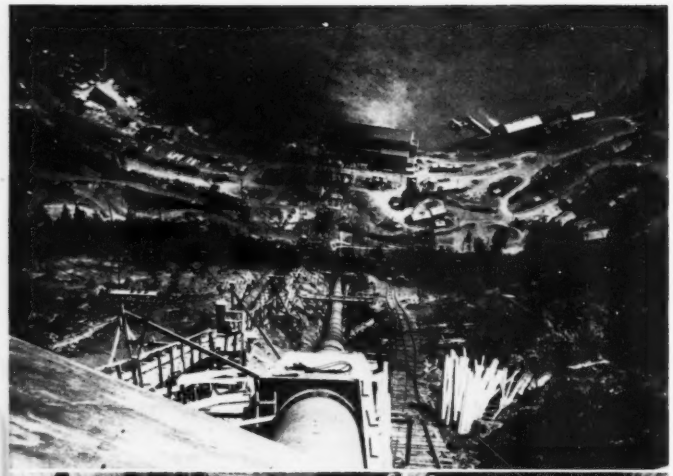
Now if the present method of disposing of the project power, which is satisfactory to everybody except the bureau and its cohorts, is unchanged and the present price is maintained, project water can be sold to irrigators at rates which are less than half the presently proposed charges. Firm or class I water could be furnished at not more than $1.50 per acre-foot canalside, and class II water at 65 cents per acre-foot even if interest on the investment in power facilities was returned to the federal treasury. The bureau does not propose to do this and in that case the cost of water could be reduced to $1.25 and 55 cents per acre-foot for class I and class II water, respectively.

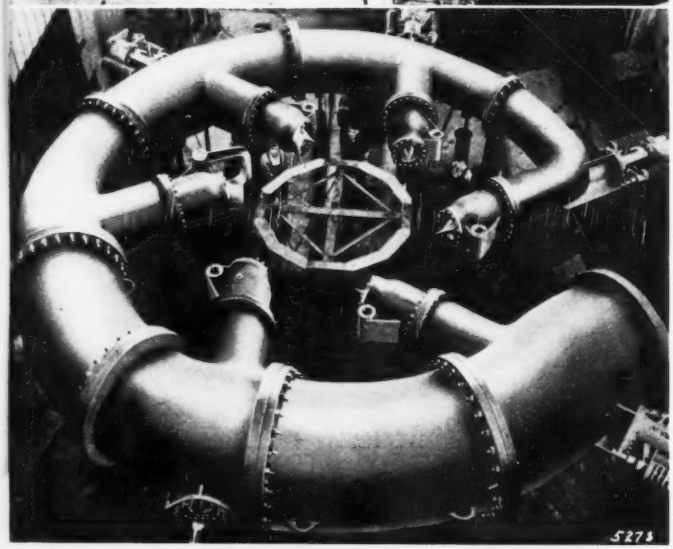
In 1937, Congress authorized the inclusion in the project of power facilities for the purpose of financially aiding the project. Without the exercise of some strict congressional guidance it is very evident that anything derived by the project from its power facilities will be on the debit side and that the financial aid mentioned in the authorizing statute will be of a minus character.

We believe that some drastic action by the Congress to expedite this construction work on the irrigation features of this project is overdue and badly needed. The necessities of the irrigators seem not to have influenced the Bureau of Reclamation. We can only hope that the Congress will take a different and more sympathetic view and that it will confine the bureau to irrigation construction in the Central Valley project until that part of the project is done.



Moss Landing power house (on Monterey Bay) of Pacific Gas and Electric Co. is well along as here shown. Plant will have three 100,000-kw. steam units the first of which is scheduled for operation in the spring of 1950





Bridge River

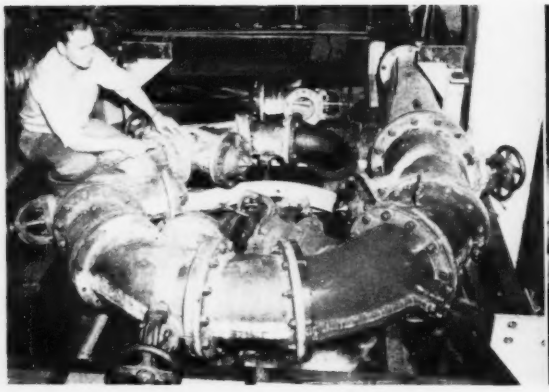
Contains world's

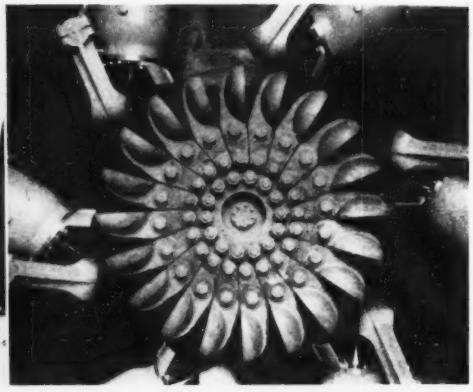
THE Bridge River hydroelectric development of the British Columbia Electric Railway Co. is unique among hydro projects on the North American continent. Several "firsts" were embarked upon, notably in the type of turbine used. Two units in a 620,000-hp. (450,000 kw.), ten-unit ultimate development are now in operation with a third unit under construction. Some 130 miles northwest of Vancouver, B. C., the Bridge River rises on the eastern slope of the Coast Range and flows in a generally eastward direction to join the Fraser River at Lillooet. In the last 15 miles of its course the river falls approximately 1,400 feet. At one point it approaches Seaton Lake from which it is separated

Looking down penstocks (upper) showing Bridge River power house on Seaton Lake. Two 45,000-kw. units are in operation. A third is being installed. Ultimately plant will have ten units

Shop assembly of full-size spiral distributor (center) for 62,000-hp., six-nozzle vertical impulse water wheel for head of 1,118 ft. This is the largest water wheel of this type ever built

One-fifth-size scale model (lower left), built and tested by manufacturer to confirm design calculations. At lower right is view from bottom of wheel pit showing runner and nozzle bodies with jet deflectors and jet protectors





Hydro Project is Unique

H. H. De Ferrari
Pelton Water Wheel Co., San Francisco

largest multinozzle vertical impulse water wheel

by less than three miles but at more than 1,200 feet higher elevation.

Such favorable conditions for hydroelectric development were recognized by engineers of the B. C. Electric Railway Co. as early as 1913, when records of stream flow commenced and engineering studies were undertaken. Twenty years ago a tunnel under Mission Mt. was completed to utilize the 1,200-ft. head between the river and Seaton Lake. Economic conditions and the war delayed resumption of development plans until 1945. At that time plans were revised to provide for a ten-unit power house on the shores of Seaton Lake. Two of these units are now in operation with the third under construction, as stated. This comprises the initial development. The present 13,200-ft. tunnel, having an equivalent circular section of 14 ft. 3 in. diameter, will handle the first five units of the development. The remaining five units will require another similar tunnel.

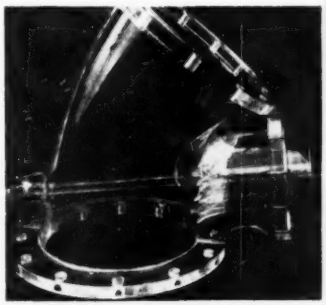
Two Storage Dams

To permit of maximum development, two storage dams are necessary, the first of which is under construction at LaJoie Falls, 40 miles upstream. The initial storage of this dam will provide pondage to operate the first units. The ultimate dam at this site will provide for sufficient storage for five units. The second storage dam will be located downstream in the vicinity of the tunnel intake. To back up the river and facilitate the flow of water into the tunnel, a diversion dam has been built two miles downstream from the tunnel intake. This dam also provides pondage for week-to-week regulation of stream flow.

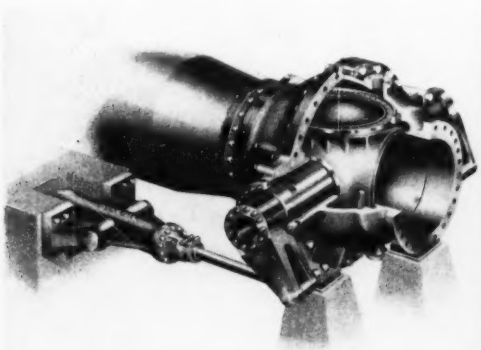
Turbine Design

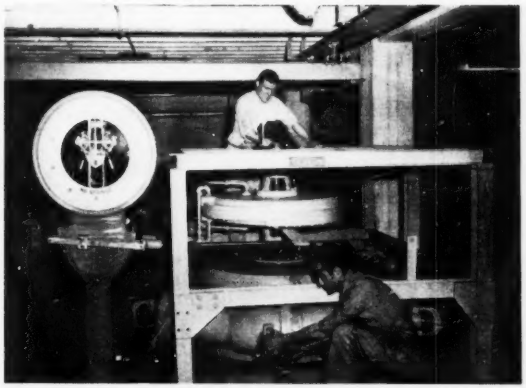
Once power studies and preliminary designs have been completed, one of the most important problems facing the designer is that of selecting the proper type of turbine to suit the specified hydraulic conditions. At Bridge River these called for a unit power output of 62,000 hp., with each turbine operating under a net effective head of 1,118 ft. and using 575 cfs. of water per machine. These conditions could be met by two distinct turbine designs: the reaction, or Francis type, and the impulse, or Pelton type. At first glance the vertical reaction turbine would appear to be most favorable as it is nearly always expected to have superior efficiency. It operates at a higher speed than an impulse turbine, thereby reducing physical size and first cost of generating equipment. However, the 1,118-ft. head at Bridge River is about the top limit for reaction turbine design. Experience, both in the laboratory and field, shows that its efficiency becomes substantially impaired. Significant also is the fact that Bridge River water carries fine pumice and glacial silt in suspension. This abrasive material would very likely have a detrimental effect on a reaction turbine. Not only would efficiency be reduced by wear of the critical sealing features, but would require a rigorous maintenance program. This would be costly in both labor and material and in energy revenue lost during unit outage for inspection and overhaul.

The B. C. Electric engineers made inquiries of three reaction turbine manufacturers and all made unqualified recommendations for the use of impulse turbines. The horizontal shaft double runner impulse turbine was ruled out early in the Bridge River de-



Lucite nozzle section (upper right) was used in model tests to observe flow patterns. At lower left is shown a cutaway drawing of the Pelton spherical valve in the open position. View at lower right shows the 1/5-size model under test at Halsey power house of Pacific Gas and Electric Company





sign program. As the plans call for an ultimate installation of ten generating units, the power house space required for this type of construction made its use prohibitive. The utility's engineers insisted upon the use of vertical shaft multinozzle turbines and manufacturing contracts were awarded on that basis.

Multinozzle Impulse Wheel

The turbine designed by the Pelton Water Wheel Co. is unique in that it is a vertical shaft six-nozzle impulse wheel rated 62,000 hp. at 300 r.p.m., operating under a net head of 1,118 ft. The six nozzles are supplied by a single spiral casing made up of eight steel castings. The largest of these containing No. 1 nozzle has an inlet diameter of 66 in., is made of metal 2⅔ in. thick and weighs nearly 12 tons after machining. The eight castings made two large gondola freight car loads. Nozzle diameter is 10½ in. The runner is formed of 20 buckets, each weighing 500 lb., bolted to a solid steel disc 6 in. thick. It is believed that this is the largest capacity vertical impulse wheel ever built.

The vertical multinozzle impulse turbine is not new. There are installations in various parts of the world that were probably made about the turn of the century. But early development of this type of turbine was hampered by lack of experimental research. Efficiencies could not be obtained that were comparable to those realized from the more conventional horizontal shaft design. In recent years, however, the more aggressive manufacturers, appreciating the advantages of vertical construction, have carried out sufficient research work with vertical impulse turbines to obtain efficiencies comparable to the best heretofore obtained from the horizontal type.

Modern practice in turbine design is based on actual results obtained from tests on laboratory models and from experience gained in the field. A sound theoretical basis for design is, of course, essential, but no matter how sound the design may be from the theoretical standpoint, it would be foolhardy to manufacture and install turbines such as those at Bridge River without first confirming design calculations by extensive model testing to assure successful operation of the prototype.

Model Tests

Accordingly, once the preliminary designs had been completed for the Bridge River turbines, four 1/5th-size scale models were constructed and a thorough and exhaustive model test program was carried out on buckets and runners, nozzle bodies and housings—both in the manufacturer's hydraulic laboratory and at the Halsey hydro plant of the Pacific Gas and Electric Co.

Every reliable hydraulic turbine manufacturer has on file data obtained from laboratory tests of impulse turbine buckets and runners covering an extensive number of designs. These test data records form the basis for selecting the proper turbine runner for any set of hydraulic conditions. The first series of Bridge River tests was made to select the bucket design that would yield the highest efficiency. The fluid phenomena pattern in a multijet impulse turbine is most complex. It was necessary to make a careful study of flow in the spiral distributor and nozzle bodies in order to reduce turbulance and to keep friction and eddy losses at an absolute minimum. The best method to follow in making this flow study was actually to watch the passage of water through a section of the distributor and needle nozzle. To do this a transparent model of the No. 2 nozzle section was made of lucite and placed in the spiral distributor to permit visual observation of the flow patterns. Motion pictures and still photographs were taken to permit a thorough investigation.

Investigations on the runner housing were probably the most critical of all tests made. Because the runner of a vertical impulse turbine is located in the horizontal plane, the water from the top half of each bucket is discharged upwards rather than downwards as is the case in the conventional horizontal shaft design. It is, therefore, highly important that the wheel housing be so designed as to provide for the proper removal of that water which is discharged upwards, and to insure that it will not interfere with the runner.

The complete Bridge River testing program represented constant work by a staff of ten engineers and required about a year to complete. Test data indicated a model efficiency of 89.8%. The gratifying results not only compensated for the magnitude of the work involved, but insured satisfactory performance of the full-size turbines.

Other Hydraulic Features

Penstocks are 2,100 ft. in length; 1 13/16 in. thick and of 75⅝-in. constant diameter. A steel liner 106 in. in diameter extends into the tunnel 340 ft., branching through butterfly valves at the portal to the penstocks. Tunnel liner joints were field welded and gamma-ray tested. Film was wrapped around the outside of the pipe and a lead capsule containing radium passed along the inside. Penstock joints are made of ring gasket-type couplings. Each is a flexible coupling to provide for expansion and contraction and possible settlement of the penstock without overstressing. Such joints have not been applied previously to penstock pressures as high as the 1,000 psi. encountered here from the 1,350-ft. static head.

At the lower end of each penstock there is a spherical valve of new Pelton design. Rather than for regulating water flow, purpose of these valves is to provide a shutoff to permit working on the turbine when necessary. Passage through the core of this valve is of the same diameter as the inside of the penstock so that friction head loss is no greater than for an equivalent section of pipe.

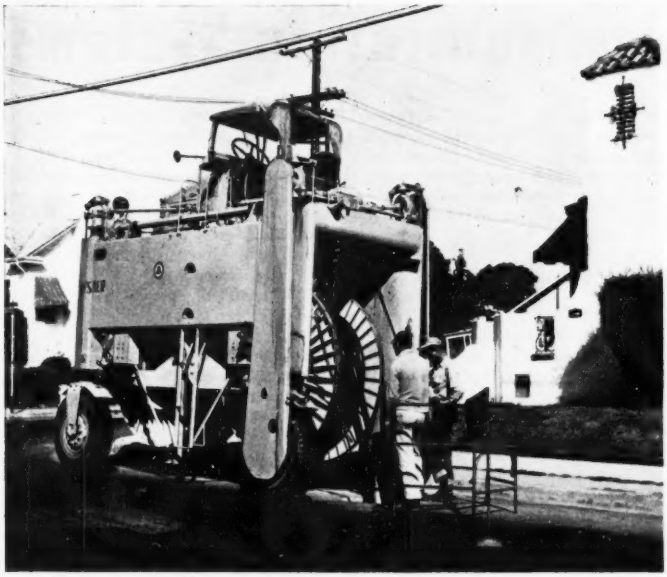
The diversion dam also has some unusual features. It is of the earth and rock-fill type with impervious clay core. Material underlying the dam consists of a deposit of silt, sand, gravel and boulders varying in depth up to 50 ft. and overlying a bed of blue clay 30 to 35 ft. thick. Nature of the clay was such that measures had to be taken so that consolidation of the mass would take place gradually. To avoid sudden changes of loading, side slopes of the dam were made unusually flat. Over-all width exceeds 600 ft., notwithstanding the fact that the height above stream bed is not over 50 ft. Length of crest is approximately 820 ft.

Provision for passing floodwater down the river was made by constructing a spillway channel 50 ft. wide and 900 ft. long, excavated through solid rock of the south abutment of the dam. A spillway section 230 ft. wide and 15 ft. lower than crest of dam protects against overtopping.

Transmission

Power from the project is transmitted to Vancouver a distance of 130 miles over a 230-kv. steel tower transmission line. Conductor is ACSR of 1,093 in. over-all diameter. Terrain over which the line was built was most difficult. Access roads totaling 140 miles in length had to be built to reach the 704 tower locations of the line. To complete the line in 390 days from the time of material delivery and under all weather conditions made the transmission line a major undertaking in itself.

With completion of this line bringing in major new generation to the Vancouver area and with the 230-kv. international tie into the Northwest Power Pool, the British Columbia utility becomes an important factor in the power supply of the Pacific Northwest.



Straddle truck of the lumber-carrier type is well adapted to underground cable construction work. Maneuverability of the unit and economy of space are particular advantages. No major changes in straddle truck are required for this work

Straddle Truck Ideal for Cable Work

M. Karp
Pacific Telephone and Telegraph Co.
San Francisco

TO aid in its current extensive construction program, the Pacific Telephone and Telegraph Co. has adapted a straddle back for use in underground cable work. This type of vehicle is observed frequently transporting lumber.

There are many advantages, both real and intangible, to be realized from the use of this compact unit.

Two reels of cable weighing up to seven and a half tons each, can be carried on spindles which fit into V-shaped saddles attached to the load tray of the straddle truck. The nine-foot turning radius permits the unit to be maneuvered with ease either within the cable reel yard or approaching a manhole.

When used for pulling-in cable, a winch, mounted between the reels of cable, is used for drawing the pulling-in line into the conduit section from a construction truck at the far manhole. The cable on the straddle truck is attached to this winch line and pulled into the conduit.

The straddle truck may also be used for pulling underground cable directly from a section of conduit onto a steel cable reel. A fish-basket type cable grip and winch line from the straddle truck are used to draw out enough cable to form one or two turns about the drum of the cable reel. The end of the cable is then secured to the cable reel flange and power to turn the reel is applied from a sprocket mounted on the winch shaft through a roller chain and demountable cable reel drive sprocket. For this type of work the maneuverability of the unit is particularly advantageous in that it may be driven directly up to, or over, an open manhole. The greater economy of space is also a consideration, making it possible to employ the straddle truck where crowded conditions might make it awkward to use conventional equipment.

Modifications made in the straddle truck for purposes of telephone work, do not constitute any major changes necessitating redesign or reinforcement of principal parts. Auxiliary equipment added to the unit is described briefly as:

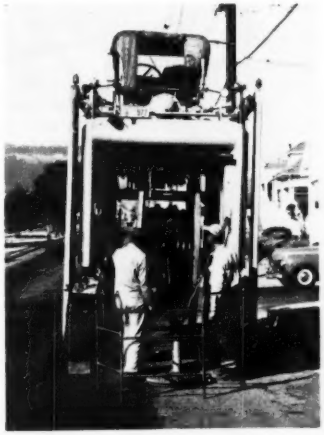
1. A single-drum winch, with a divided drum, is mounted on angle brackets between the cable reels. Power for rotating either the winch drum or a roller chain sprocket attached to the winch shaft, is transmitted from the truck engine to the winch shaft by means of a roller chain drive power take-off.

2. The cable reel spindle saddles are fabricated from steel bar stock and are bolted to the load tray. Locking pins are provided to prevent the spindle from being displaced from the brackets.

3. A roller chain and a demountable cable reel drive sprocket used in cable removal work are carried, respectively, on brackets attached to the load tray and inner side plate.

4. A winch line guide is installed on the upper rear of the unit. It consists of a yoke straddling a sliding sheave which is positioned by a small hand-driven work winch to effect a uniform lay of the winch line on the winch drum.

Two reels of cable weighing 7½ tons each are transported directly from storage to job by straddle truck. Nine-foot turning radius permits unit to be maneuvered with ease when approaching manhole, or within cable reel yard



Microwave Communication Systems

THE last thirty-five years have witnessed a remarkable increase in the use of telephone and telegraph communication. However, it has been apparent for some time that the cost of installation and maintenance of wire lines through isolated areas is exorbitantly high. In certain instances radio communication systems have been set up to avoid the installation of wire lines. The communications engineer may now visualize extensive communication networks in which wire and radio transmission systems coordinate in providing facilities which could not otherwise be achieved economically.

Severe storms sometimes cause extensive damage to wire lines and interrupt communications, spotlighting the need for dependable systems, unaffected by weather conditions. Such requirements can be met by microwave relay systems.* Such systems are now in service, an example being the system between New Glasgow, Nova Scotia and Charlottetown, Prince Edward Island, installed by the Federal Telephone and Radio Co. for the Maritime Telephone Co. This system provides 21 telephone circuits plus one program channel by means of pulse time modulation. The system was chosen on an economic basis with consideration for its increased reliability as compared to cable which is subject to periodic ice damage, and has already proven its reliability when other types of systems were disrupted.

This article will go into the general application of microwave radio relay systems, without discussing technical aspects of the various methods of modulation. These are described in various papers and publications. However, certain fundamental requirements will be covered before general application is discussed.

The choice of operating frequency is of primary consideration, and theoretically any radio frequency consistent with band width requirements may be used. From a practical standpoint Federal Communications Commission allocations must be complied with. Due to use by other services of lower frequencies, and in order that high power gain antennas may be used with practical sizes, the use of frequencies above 860 megacycles is dictated for this service. For frequencies over 6,000 megacycles absorption and diffraction effects become more important. Technical development of satisfactory equipment makes the use of such frequencies difficult.

It has been found that frequencies between 900 and 6,000 megacycles offer the most likely prospects. Design limitations, along with FCC allocations, have led to the development by the Federal Radio and Telephone Co. of two general systems, an FM multichannel radio link operating in the 890- to 960-megacycle range and a pulse time modulation multichannel radio link operating in the 1,825- to 2,100-megacycle band.

The FM link operates on the basis of frequency division for multiple-channel operation and finds application where relatively few repeaters and channels are involved. The pulse time modulation (PTM) link uses time division and usually is more suitable for a large number of channels or for long-distance transmission involving the use of many repeaters.

Frequency division systems are limited in the number of repeaters that can be used, due to inherent distortion and cross talk in the repeater. Such limitations are not imposed in the time division system, consequently high quality transmission through many repeaters is possible.

On an economic comparison, the 23-channel PTM system uses a certain amount of common equipment in the multiplex bays, and the cost of individual channel equipment is relatively small, while the FM system only requires common radio frequency equipment and the channel equipment uses independent carriers. Federal recommends the use of the FTR 9-H-1 short-haul carrier for providing the necessary voice-modulated sub-carrier.

In Fig. 1 is shown a block diagram of the FTR 11-T-1 relay link equipped

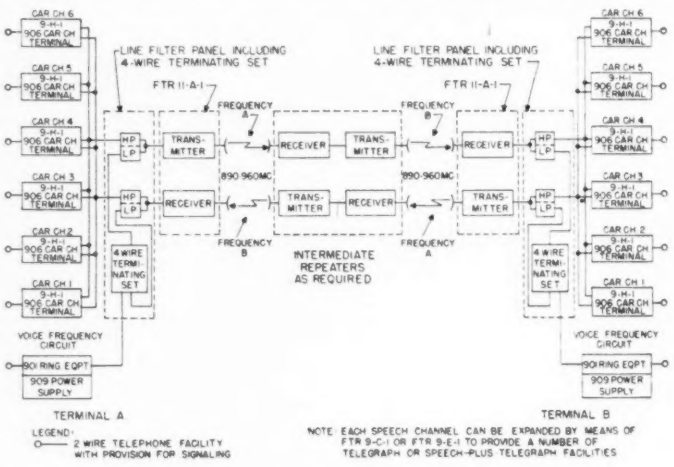


Fig. 1

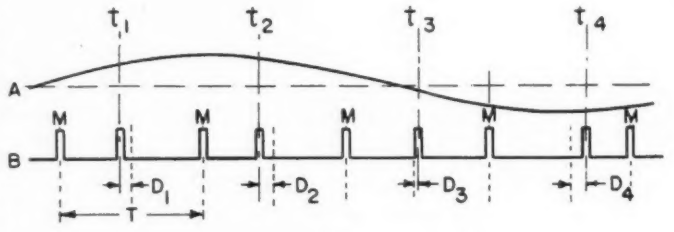


Fig. 2

* Based on a paper "Pulse Time Modulated Microwave Communication Systems," by Ralph G. Maddox, systems engineer for Federal Telephone and Radio Corp., presented before the PCEA convention at Coronado, Calif., May 26, 1949. Adapted for publication by R. H. Miller, chairman of the communications committee of the Pacific Coast Electrical Assn.

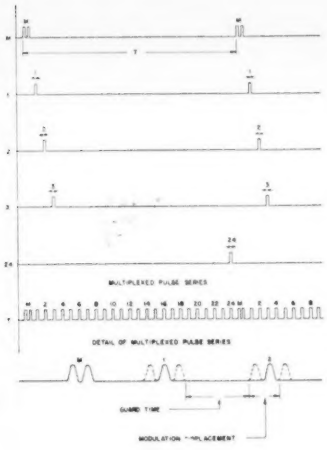


Fig. 3

with FTR 9-H-1 short-haul carrier equipment. Seven telephone channels here are derived by means of frequency division, that is the normal audio band plus six derived from carrier channels, which translate frequencies upward at the transmitting and downward at the receiving ends of the equipment. These processes are called "modulation" and "demodulation" respectively and the physical combination of the device which accomplishes this frequency translation is commonly referred to as a "modem."

The deriving of multichannel operation usually is referred to as "multiplexing" and the system described above is called "frequency division multiplexing," which is employed in the Federal FT-901 Frequency Division Multiplex Radio Link. A second method of multiplexing known as time-division multiplex is employed in the FT-1001 Time-Division Multiplex Radio Link. This method of multiplexing, together with pulse modulation, solves many of the radio frequency transmission problems.

The basic principle of this system is to transmit a train of pulses whose relation to each other in time, represent the intelligence. This can best be understood by reference to Fig. 2 which shows a one-channel system. Two sets of pulses are shown, one set is known as the marker pulse and the time spacing between succeeding marker pulses is always the same. The function of the marker pulses is to synchronize the demodulator in the receiver with the modulator in the transmitter. The second set of pulses shown in Fig. 2 carry intelligence. The time spacing of the intelligence pulses varies in accordance with the instantaneous amplitude of the audio signal and is shown by successive increments D_1, D_2, D_3, and D_4 at the scanning times of T_1, T_2, T_3 and T_4 respectively.

As the displacement D is only a fraction of the total period T, the remainder of the time interval pulses carrying the modulation for other channels are interleaved as shown in Fig. 3.

The marker pulses are given distinguishing characteristics of separation or width so that they can be separated from the pulses carrying the intelligence. By providing proper repetition rates, a true reproduction of the modulating signals is provided and, by limiting the maximum swing of modulation displacement, each channel is made independent of the others. An audio band width of 300 to 3,400 cycles is provided for each channel, and two channels can be combined to provide program channels flat from 50 to 6,800 cycles.

Output of the modulator terminal called a "video" signal is applied to the radio transmitter and is transmitted as a pulse-modulated radio wave. The receiver used is of the superheterodyne type and provides a "video" signal output to the demodulator terminal, where the individual channels are separated.

This system of multiplex offers many advantages over the frequency division system. An improved signal to noise ratio is possible, simultaneous transmission of a large number of channels is possible, very simple circuits are used, distortion and cross talk are independent of the number of repeaters used and channels may be dropped and inserted at intermediate repeater locations.

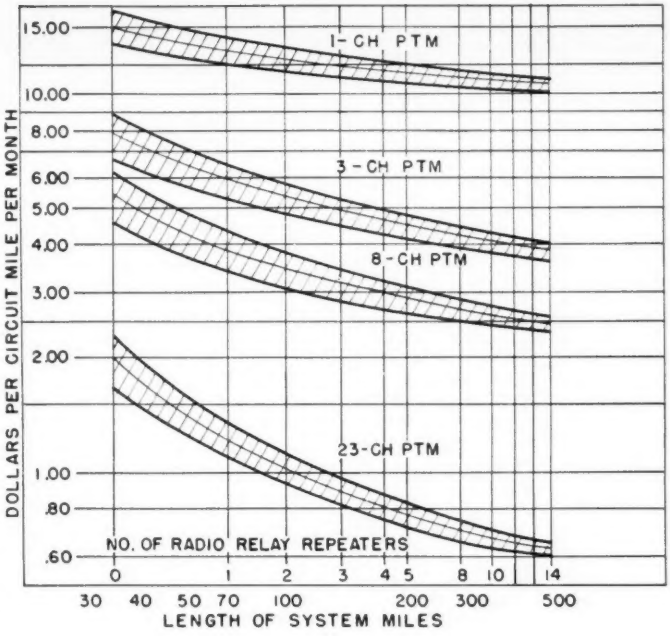


Fig. 4

Cost studies of PTM microwave radio relay systems of various lengths and for various numbers of derived channels have been made, including the cost of towers, land, right-of-way, buildings and stand-by power in general accordance with Bell system practice. Such a study cannot, of course, cover all types of facilities or conditions, but is intended to serve as an index for field application of microwave systems. The breakdown of the costs have been plotted in Fig. 4, to show trends as channels and distances are increased. The estimated cost of operating spares such as tubes is less than one per cent of the initial radio equipment, and most tubes are of the dollar variety.

Microwave radio links are flexible in application and lend themselves readily to telemetering, supervisory and remote control applications. It is hoped that the foregoing discussion of microwave systems will indicate the possibilities of such systems along with their associated channelizing equipment as a solution of power system communication problems.

Electrical West—Vol. 103, No. 2

Street Lighting — Series or Multiple?

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RECENTLY, several utilities in the Pacific Northwest, including The Montana Power Co., implemented a program to provide communities with new or replacement street lighting. Under this plan the lighting is financed, owned, operated, and maintained by the utility. The excellent acceptance of the new plan has provided a considerable impetus to the modernization and extension of high-level lighting throughout the region.

With cities and towns relieved of the necessity of floating improvement bond issues to finance new municipal systems, and with the property owners provided with excellent lighting for small monthly payments, demands for street lighting under the new program have outstripped, for the time being, the capacity of the utilities for financing and installation. One of the most favorable aspects of the plan is that it is geared to pay out over a 25- to 30-year period, rather than the eight-year period required by most bond issues.

With the tremendous demand, financing of the new installations has become a very heavy item to the utilities, and it is imperative that the systems be constructed as economically as possible, while keeping future operating and maintenance costs to an absolute minimum. To accomplish this, extreme care was used in the selection of the type of system finally approved.

Choice of units, supports, spacing, and mounting height were fairly simple engineering decisions, based on the greatest possible amount of light per dollar of investment and customer payment. But determination of the electrical characteristics that would give the best results proved to be a more complicated system. Not only was it necessary to evaluate the advantages and drawbacks of series or multiple systems, but in considering the series system it was further necessary to compare the 6.6-amp. and the 20-amp. types. Consequently a very detailed study of all systems was made before it was possible to reach a final decision on which type would be adopted as the standard.

For comparison purposes, a typical installation of eight blocks of lighting on one avenue from alley to alley was used. The avenue blocks are 430 ft. in length, intersection to intersection, the cross street blocks 400 ft. alley to alley. In both residential and business districts four staggered units are used per block on the avenues, with two staggered units per block on streets, a total of six units per block.

The installation consists of enclosed, pendent units on 5-ft. brackets, using 6,000- to 10,000-lumen units mounted at 25 ft. on 30-ft. painted wood poles. Where 15,000-lumen units are used, they are installed at the top of 31½-ft. steel standards, on a 6-ft. bracket. Lamp supply in all cases is by overhead wire, the cost of underground cable being considered prohibitive in providing street lighting under this program.

Choice of System

To determine the most economical and efficient electrical system for the above typical installation, a great number of variables had to be taken into account. First, the lamp lumens and wattage, the current or voltage at

TABLE I

Comparison of Series and Multiple Systems

A. Advantages of Series System

1. Low I^2R line loss.
2. Only one overhead conductor necessary. Public will accept one wire more readily than two wires of multiple circuit.
3. Independent from 120/240-volt system.
4. Lamp wattages lower than multiple lamps of same lumen output.
5. Lamp filaments stronger than those of multiple lamps.
6. Street light transformer losses are not continuous but are on only during street lighting burning hours.
7. Standard series lamps have a 2,000-hour life as compared to 1,500 hours for standard multiple lamps.
8. Reliability of system proved by many years of use.
9. Constant current provides a steady light output.
10. More uniform output of series lamp throughout its life.
11. Supply and control of lamp is simple because the energy is supplied at few points.
12. Highway lighting can be supplied more economically by this system where secondary circuits are not available.
13. This type of system lends itself more readily to dead-ending on avenues and streets. (See Chart 1 and 2.)

B. Advantages of Multiple System

1. Low open-circuit voltage, 120 volts.
2. Cost per kva. transformer capacity much less than kva. of series transformer.
3. Lamps cheaper in lower lumen output than series.
4. Large area outages eliminated because lamps are few in number on each circuit and are fed from local sources.
5. Minimum probability of primary wires swinging into lamp circuits and causing wholesale outages.
6. Power factor is better than for series circuits.
7. Multiple circuits are placed on secondary level on poles and are not as hazardous to work on.

TABLE II

Comparison of Series Circuits—6.6 amp. and 20 amp.

A. Advantages of 6.6-amp. series circuit

1. Lower I^2R line loss than 20-amp. circuit.
2. Smaller conductor can be used.
3. More economical for series lamps up to and including 6,000-lumen lamps.

B. Advantages of 20-amp. series circuit

1. Secondary open-circuit voltage of transformer is 1/3 that of 6.6-amp. transformer.
2. IL transformer not required for 15,000-lumen lamps and larger which are made only in 20-amp. rating.
3. Wattage of 20-amp. lamps is less than 6.6-amp. lamps.
4. Cost of 20-amp. lamps is less than 6.6-amp. lamps.

TABLE III

Comparison of Series and Multiple Street Lighting Systems
8 Blocks — 48 Lamps

	6,000-lumen lamps			10,000-lumen lamps					15,000-lumen lamps				Mercury lamp
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Circuit current or voltage	6.6A	20A	120V	20A	20A	6.6A	120V	120V	6.6A	20A	6.6A	120V	20A
Type lamp	Std.	Std.	Std.	Std.	Group	Std.	Std.	Group	Group	Std.	Std.	Std.	Std.
Rated hours	2,000	2,000	1,500	2,000	3,000	2,000	1,500	3,000	3,000	2,000	2,000	1,500	4,000
Lamp watts	310	295	370	485	505	535	575	620	590	715	715	800	400
Wire size B.H.D.	#8	#6	#8	#6	#6	#8	#8	#6	#8	#6	#8	#6	#6
Trans. capacity kva	20	20	25	30	30	30	25	$37\frac{1}{2}$	30	2.20	2.25	$37\frac{1}{2}$	2.20
Lamp cost—net	.945	1.015	.875	1.295	1.47	1.54	.91	1.015	1.715	1.785	1.785	2.695	7.35
Annual lamp replacement	90.72	97.44	112.00	124.32	94.08	147.84	116.48	64.96	109.76	171.36	171.36	344.96	352.80
Power to lamps	758.88	722.16	905.76	1,187.28	1,236.24	1,309.68	1,407.60	1,517.76	1,444.32	1,750.32	1,750.32	1,958.40	979.20
Annual Dep.													
Relay			12.58				12.58	13.44			13.44		
IL Trans.										104.40			94.80
Ballast													
Transformer	34.50	34.50	12.00	44.65	44.65	44.65	12.00	15.72	44.65	69.00	80.60	15.72	69.00
Wire	12.12	19.39	10.73	19.39	19.39	12.12	10.73	14.94	12.12	19.39	12.12	14.94	19.39
Contactor and protector	8.40	8.40		8.40	8.40	8.40			8.40	16.80	16.80		16.80
Losses													
Relay			5.51				5.51	5.51				5.51	
IL Trans.											73.44		
Ballast													90.58
Transformer	45.39	44.88	27.12	56.56	56.51	56.10	31.91	35.23	53.50	83.64	93.84	41.55	43.35
Wire	23.00	132.80	31.57	132.80	132.80	23.00	76.50	21.57	23.00	132.80	23.00	45.44	132.80
Contactor and protector	9.18	9.18		9.18	9.18	9.18			9.18	18.36	18.36		18.36
Total cost	982.19	1,068.75	1,117.27	1,582.58	1,601.25	1,610.97	1,673.31	1,689.13	1,704.93	2,261.67	2,344.24	2,439.96	1,817.08
Voltage drop													
Maximum			6.65%				10.4%	2.15%				3.1%	

which they operate, the lamp life in hours both for standard and group replacement types. The supply wire size must be selected, usually a choice between No. 6 and No. 8 bare hard-drawn copper.

The necessary transformer capacity required a detailed analysis. For constant-current series systems, the capacity to be installed is a simple function of the lamp factor multiplied by the number of lamps. But in multiple systems, the additional capacity would be represented by increased increments in the capacity of distribution transformers at the various supply points on the system, depending on the present location of transformers and the most convenient connection points.

This additional transformer capacity for multiple systems cannot be stated simply in terms of rated load. When the lamps are on, the demand is constant, but it is superimposed on distribution load with a diversity factor of from zero to 100%. For instance, if the typical system described were connected on transformers such as 1—$7\frac{1}{2}$-kva., 2—10-kva., and 3—15-kva. units, a total of $72\frac{1}{2}$ kva., and these transformers were already fully loaded at the peak period, it would be necessary to substitute larger transformers to handle the additional street lighting increment. Assuming that the new installation would draw 18 kw. equally divided among the existing transformers, it would be necessary to replace with transformer capacity of 1—10-kva., 2—15-kva., 3—25-kva., a total of 115 kva. Although in tables used for purposes of simplification all the additional transformer capacity required for multiple installations has been shown as concentrated in one transformer unit, it can be seen that the actual additional capacity in increments as shown above would be considerably more costly to provide than a single transformer.

In estimating lamp replacements, 4,000 burning hours was assumed as a standard for this geographical region. Therefore, a lamp rated at 2,000 hours would require two lamp replacements per year, and a 1,500-hour lamp, $2\frac{2}{3}$ lamp replacements per year.

Electrical energy consumed by the lamps was calculated on the basis of $51 per kilowatt-year multiplied by the lamp wattage.

Cost of equipment was figured on the net or actual cost to the utility rather than the list price. The annual depreciation figure is simplified for comparison purposes. A 25-year straight line depreciation resulting in a 5% annual depreciation on the purchase price was used. Equipment items for which depreciation was considered include transformers, wire, contactors,

photoelectric or magnetic relays, ballasts used on mercury-vapor lamps, IL transformers used for 20-amp., 15,000-lumen lamps on a 6.6-amp. series circuit, and protectors used on all series circuits.

Electrical losses were also determined for the equipment items listed above, using data standards for nationally known equipment. Losses were converted into dollar values on the basis of $51 per kilowatt-year. The I^2R loss for wire was calculated separately for series and multiple circuits. Transformer losses for multiple systems were calculated on the hypothetical use of a single transformer to carry the load, as explained earlier. These transformer losses were figured on full load for 4,000 burning hours, and the no-load loss on the remaining 4,760 hours of the year.

Results of Analysis

The results of these various calculations are shown in the following tables. Table I compares the series and the multiple system; Table II compares the 6.6-amp. with the 20-amp. series system. In Table III the typical eight-block installation described earlier is tabulated to show the differentials in the use of 6,000.- and 10,000.- and 15,000-lumen incandescent lamps, and mercury vapor lamps. While cost considerations eliminated the mercury vapor lamp early in the study of this low-cost system, it is included as an interesting comparison.

It will be noted that labor costs have not been included in the various studies, mainly because no two engineers will agree on what constitutes labor costs, and because of the variation in wage scales in various areas. However, for comparison purposes, labor costs can be assigned for the various installations in accordance with individual experience, and the prevailing labor scale in the particular area.

A flat figure for lamp replacement might have been used, but replacement practice varies among different utilities. Some replace standard lamps as they burn out, others use group replacements. Each method involves a different labor cost.

However, the labor cost for replacement does not affect the comparison of the various types of series lamps to any appreciable degree. On the shorter-lived multiple lamps it would only serve to increase further the cost disadvantage of this type. Also, in the tabulation, the 3,000-hour rated life of group replacement series lamps rather than the recommended life of 2,500 hours between replacements was used.

Conclusions

On the basis of the results shown in Table III, The Montana Power Co. set up specifications which have been followed on a large number of installations already made. The analysis showed that, in the use of incandescent lamps, the series system was in all cases more economical than the multiple system. On series systems, it was determined that the 6.6-amp. system had advantages in the lower ratings, while in the 10,000- and 15,000-lumen range the 20-amp. system was definitely superior. Advantages of the single-wire series circuit over the 2-wire multiple circuit for lamp supply were not only evident in the cost analysis, but also from appearance and construction considerations. The public finds the single overhead wire much less objectionable. In areas with large shade trees, where tree wire is used, it has proved much easier and cheaper to construct and maintain a single wire than the two wires required by the multiple circuit.

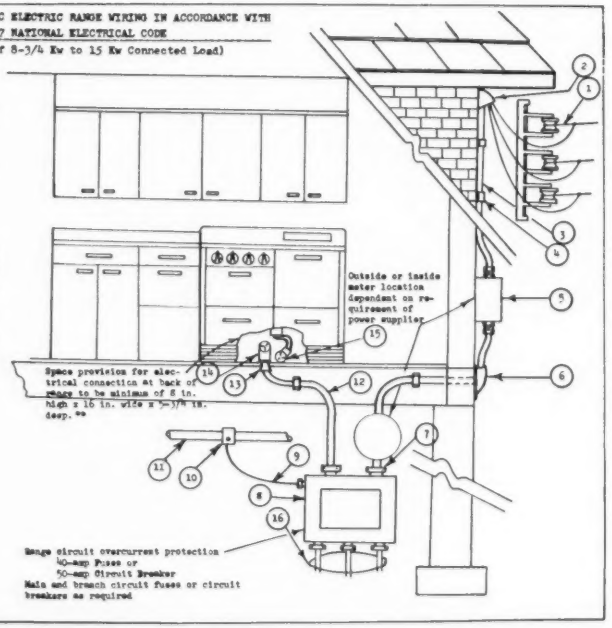
Proper installation of electric range wiring is explained in this chart put out by the engineering department of the National Electrical Manufacturers Assn. It lists and illustrates provisions of the code pertaining to the applications of the various cable assemblies to range wiring. Applicable for ranges of 8¾ to 15 kw. connected load

A METHOD OF DOMESTIC ELECTRIC RANGE WIRING IN ACCORDANCE WITH 1947 NATIONAL ELECTRICAL CODE

(For Ranges of 8-3/4 Kw to 15 Kw Connected Load)

MATERIAL LIST

Item	Description	1947 Nat'l Elec'l Code Reference
1.	Service Drop	2301, 2303, 2304
2.	Service Head	2337
3.	Service Entrance Cable, Type SE, Style A or U	2304, 2305, 2331, 2332
4.	Service Entrance Cable Strap	2325, 2336
5.	Meter (by Power Supplier)	
6.	Sill Plate	
7.	Non-Watertight Connector	3004
8.	Service Equipment and Distribution Center	2371, 2371, 2372 thru 2375.
9.	Grounding	2523, 2525-b, 2552 2553, 2554, 2560 2591, 2592, 2594 2595, 2599 2612 to 2617, incl.
10.	Ground Clamp or Fitting	2541
11.	Ground, cold water service pipe	2582, 2583, 2584, 2586
	If cold water pipe not available	
12.	Service Entrance Cable - Type SE, Style A or U	2116-a-1, 2121-a-1 3004, 3005
	Armored Cable, or Non-Metallic Sheathed Cable (Two No. 8 - one No. 10 Conductors)	ARTICLES 334, 336 and 338
13.	Conduit or Raceway if service cable or non-metallic sheathed cable is used	3364-b
14.	3-Wire Outlet	4241-a
15.	3-Wire Range Cord Set* (Two No. 8 - one No. 10 conductors)	2560, 4241-a
16.	Lighting and Appliance Circuits	2115-a and b


Outside or inside meter location dependent on requirement of power supplier
Space provision for electrical connection at back of range to be minimum of 6 in. high x 16 in. wide x 5-3/4 in. deep. **
Range circuit overcurrent protection
40-amp Fuse or
50-amp Circuit Breaker
Main and branch circuit fuses or circuit breakers as required

*NEMA Standard WD5-20
**NEMA Standard WD5-15

Standard Service Requirements

Harry W. Bruce
Chairman
PUESR Coordinating Committee

THE Pacific Utilities Electric Service Requirements Coordinating Committee was organized by serving agency engineers in southern California who were interested in better and more uniform metering installations without increasing the cost to the customer.

Supplying instrument transformers to the switchboard manufacturer to be built into the bus bar structure was costly to the manufacturer and to the serving agency. The manufacturer could not lay out the bus structure drawing until he knew what transformers would be furnished. The serving agency could not furnish the transformers until the customer had been contacted and the equipment he expected to connect had been ascertained. In many cases this connected equipment was increased and it was necessary to change transformers before service was rendered. In many cases the changing of transformers meant cutting and redrilling the bus.

With the advent of the standard 600-volt, wound primary, current transformer engineers of the Department of Water & Power, City of Los Angeles, took steps to establish a standard bus structure that would permit interchange of current transformers, 200 to 600 amp., without changing the bus.

For many years engineers of the Southern California Edison Co. and the City of Los Angeles got together and discussed their service requirements and coordinated them wherever possible. This was helpful to the contractor and to the switchboard manufacturer because there was so much common boundary.

In 1947 a meeting was held with the switchboard manufacturers in Los Angeles to get their ideas on a standard switchboard-service section. The switchboard manufacturers were very cooperative and built some sample boards according to prepared drawings, and offered many constructive criticisms.

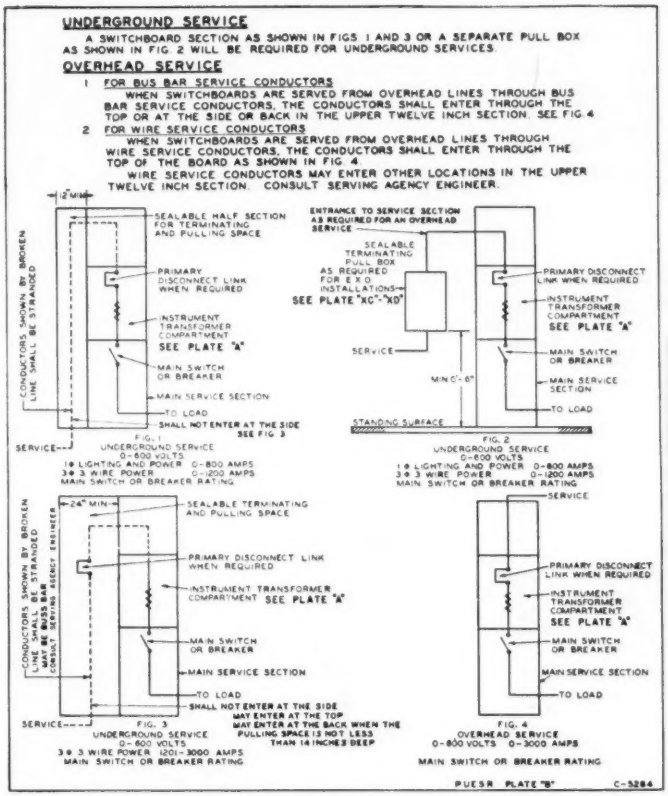
The thinking at this time was to solve only the problem of supplying the instrument transformers to the switchboard manufacturer, and to provide a bus structure that would permit changing instrument transformer without cutting or drilling the bus.

The switchboard manufacturer developed a standard service section as shown for the instrument transformers, the main service switch, and a panel for the watt-hour meter, "A" or "S" base, and a secondary test switch.

The suggestion was then made that it would be desirable if all of the serving agencies in southern California would accept this standard service section. It would help to reduce its cost. It was decided that all serving agencies in southern California should be invited to send engineers to a meeting and form a standardization committee if sufficient interest were shown. The response was very satisfactory and a permanent committee was formed and work was started on the standardization of electric service requirements in September 1947.

In June 1948, the serving agencies in northern California organized a northern group of the Pacific Utilities Electric Service Requirements Coordinating Committee and, in June 1949, the Central Arizona Power Co.'s representative, who has been attending the southern group meetings, reported that he had contacted other serving agencies in Arizona and that they desired to organize an Arizona group. These three groups, Arizona, northern and southern California, will coordinate their requirements into one standard insofar as practical.

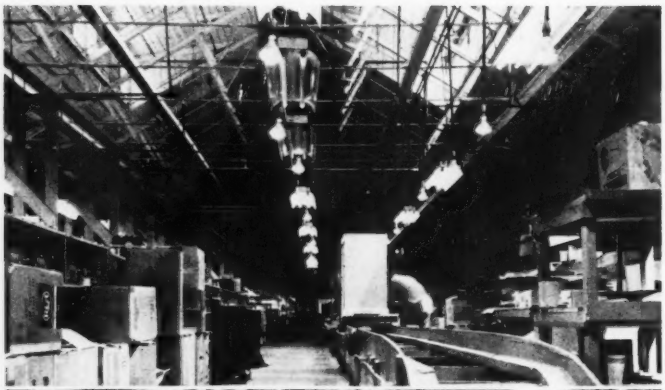
The southern group has completed and issued to member companies standardized service requirements for switchboard and so-called EXO metering installations.* Several utilities have already revised their service requirement bulletins based on the new standards. The committee is now working on standardization of customer's service poles and overhead service requirements.

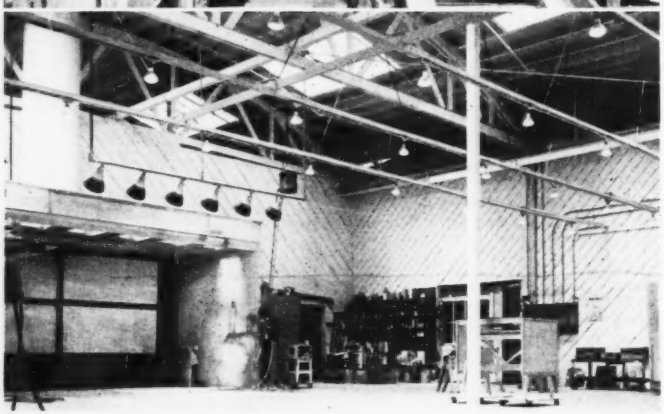

UNDERGROUND SERVICE
A SWITCHBOARD SECTION AS SHOWN IN FIGS. 1 AND 3 OR A SEPARATE PULL BOX AS SHOWN IN FIG. 2 WILL BE REQUIRED FOR UNDERGROUND SERVICES.
OVERHEAD SERVICE
1 FOR BUS BAR SERVICE CONDUCTORS
WHEN SWITCHBOARDS ARE SERVED FROM OVERHEAD LINES THROUGH BUS BAR SERVICE CONDUCTORS, THE CONDUCTORS SHALL ENTER THROUGH THE TOP OR AT THE SIDE OR BACK IN THE UPPER TWELVE INCH SECTION. SEE FIG. 4
2 FOR WIRE SERVICE CONDUCTORS
WHEN SWITCHBOARDS ARE SERVED FROM OVERHEAD LINES THROUGH WIRE SERVICE CONDUCTORS, THE CONDUCTORS SHALL ENTER THROUGH THE TOP OF THE BOARD AS SHOWN IN FIG. 4
WIRE SERVICE CONDUCTORS MAY ENTER OTHER LOCATIONS IN THE UPPER TWELVE INCH SECTION. CONSULT SERVING AGENCY ENGINEER.
SEALABLE HALF SECTION FOR TERMINATING AND PULLING SPACE
PRIMARY DISCONNECT LINK WHEN REQUIRED
INSTRUMENT TRANSFORMER COMPARTMENT SEE PLATE "A"
MAIN SWITCH OR BREAKER
MAIN SERVICE SECTION
TO LOAD
SHALL NOT ENTER AT THE SIDE SEE FIG. 3
CONDUCTORS SHOWN BY BROKEN LINE SHALL BE STRANDED
SERVICE
FIG. 1
UNDERGROUND SERVICE
0-600 VOLTS
1Φ LIGHTING AND POWER 0-800 AMPS
3Φ 3 WIRE POWER 0-1200 AMPS
MAIN SWITCH OR BREAKER RATING
ENTRANCE TO SERVICE SECTION AS REQUIRED FOR AN OVERHEAD SERVICE
SEALABLE TERMINATING PULL BOX AS REQUIRED FOR E.X.O. INSTALLATIONS SEE PLATE "XC"-"XD"
SERVICE
MIN. 0'-6"
STANDING SURFACE
FIG. 2
UNDERGROUND SERVICE
0-600 VOLTS
1Φ LIGHTING AND POWER 0-800 AMPS
3Φ 3 WIRE POWER 0-1200 AMPS
MAIN SWITCH OR BREAKER RATING
24" MIN.
SEALABLE TERMINATING AND PULLING SPACE
PRIMARY DISCONNECT LINK WHEN REQUIRED
INSTRUMENT TRANSFORMER COMPARTMENT SEE PLATE "A"
MAIN SWITCH OR BREAKER
MAIN SERVICE SECTION
TO LOAD
SHALL NOT ENTER AT THE SIDE
MAY ENTER AT THE TOP
MAY ENTER AT THE BACK WHEN THE PULLING SPACE IS NOT LESS THAN 14 INCHES DEEP
SERVICE
FIG. 3
UNDERGROUND SERVICE
0-600 VOLTS
3Φ 3 WIRE POWER 1201-3000 AMPS
MAIN SWITCH OR BREAKER RATING
FIG. 4
OVERHEAD SERVICE
0-800 VOLTS 0-3000 AMPS
MAIN SWITCH OR BREAKER RATING
PUESR PLATE "B"
C-5284

Sample of one of many drawings that go to make up standardized service requirements prepared by the southern group of PUESR Coordinating Committee

* The author has advised Electrical West that those desiring a copy of the new standards may obtain one by addressing him at 1324 Wall St., Los Angeles 15, Calif.

Comfort Heating with Infrared Lamps

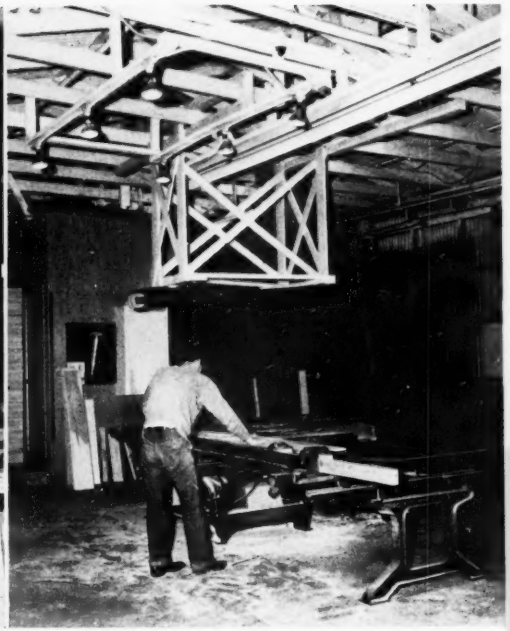




INFRARED lamps have solved a difficult comfort heating problem in the cabinet factory of the Hoffman Radio and Television Corp. in Los Angeles. In this building, originally a streetcar barn, with beam height of 24 ft. and comb height of 45 ft., it was not practicable to raise the air temperature to a comfortable level. Further aggrevating the problem besides extreme height and the vast open space was the fact that there is a tremendous air evacuation caused by a dual mill exhaust system and seven spray booths.

Under these conditions 50 kw. of 375-watt, R-40, self-contained reflector heat lamps are used to transfer energy to workmen whose activities are localized. This eliminates the disadvantages of methods that would require heating the great mass of air in the building. Thermal effectiveness of radiant heat is high, since air does not absorb an appreciable amount of radiated energy from the filament lamp sources. Lamps are mounted 10 ft.

Comfort heating problem in this converted streetcar barn (above) was solved by use of infrared lamps mounted 10 ft. above floor. View is in Los Angeles cabinet plant of the Hoffman Radio & Television Corp. At center is another view in the plant showing use of infrared lamps on the assembly line. Below is shown the heat lamp installation in spray booth area



Another installation of infrared lamps for comfort heating is that at the plant of the Grand Rapids Store Equipment Co. of Los Angeles. Groups of six 375-watt, R-40 lamps mounted in rectangular patterns were found to be the only successful means of heating large drafty areas. More than 100 kw. of such lamps are installed

above the floor in rows approximately 4 ft. apart. Some assembly line functions lend themselves to a single row of lamps mounted directly overhead. Other operations are better handled by straddling the workmen with lamps in a rectangular pattern.

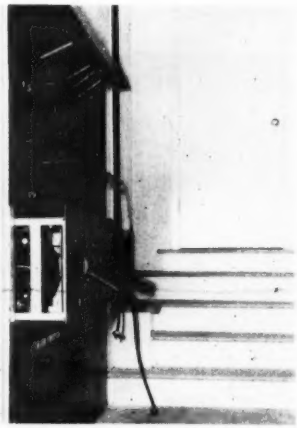
In addition to the pleasant warmth imparted by the heat lamps, an additional source of light is made available. This is a further aid to workers. However, glare may become objectionable if the face of the lamp is within the normal line of vision. To overcome this problem, swivel sockets for directional control were found desirable in some locations.

During certain periods in the southern California winter there is an action called "blushing" which occurs in cabinet finishing. This is caused by a combination of low temperature and high humidity. In many cases it forces either the shutdown of a plant or the use of certain retarders in the finishing materials which slow the finishing process considerably. Hoffman's production manager reports that after the installation of infrared lamps in the finishing department, the raw cabinets are quickly brought up to a desirable temperature for application of various stains and finishes, thus speeding production and producing better cabinet finishes.

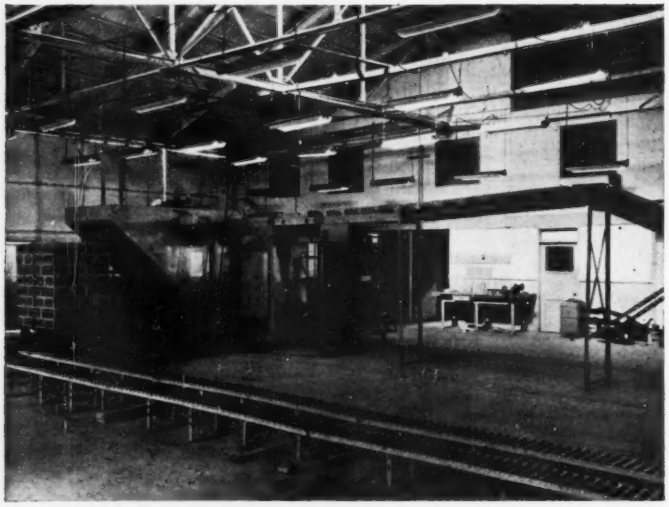
Another firm to solve a difficult heating problem with infrared radiation is the Grand Rapids Store Equipment Co. of Los Angeles. Standard methods of air heating were considered impractical for their large, drafty plant. David Collings, industrial heating consultant of the Los Angeles Department of Water & Power, was called in. Acting upon his recommendation, six 375-watt, R-40 industrial type heat lamps were mounted in porcelain sockets over one bench. This test installation was so satisfactory that additional lamps were placed throughout the building. In three years of use, infrared has proved to be a practical and economical heating system for this company, which now has more than 100 kw. of such lamps.

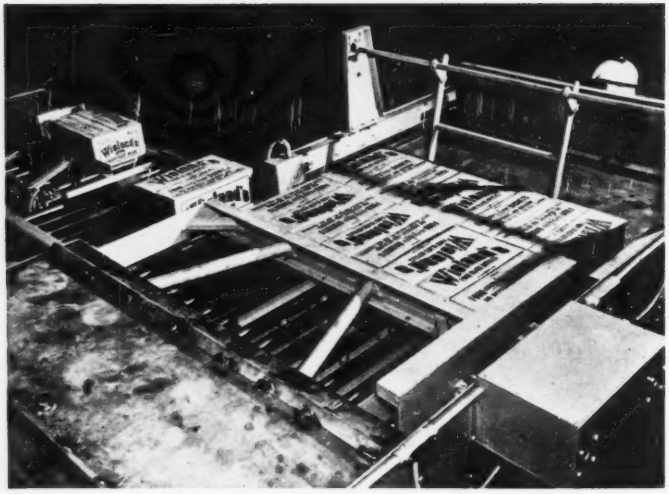
"Dimmer Drawer" Stage Control Board

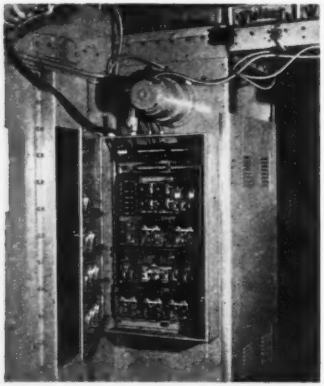
Westlite unit dimmer control board installed at Palo Alto Elks Club consists of three "dimmer drawers" that go to make up assembled board. Drawers are equipped with twelve multi-capacity non-interlocking variable autotransformer dimmers. With all the advantages of proportionate dimming, the board eliminates the large investment in mechanical interlocking assemblies. Board was developed by Associated Lighting Service of San Francisco. Progress Electric Co. of Palo Alto, was the electrical contractor.



Automatic Pallet Loader







This control cabinet contains the "brains" of a machine that takes cartons from a production line and automatically stacks them on pallets to be carried away on fork-lift carriers. Control for operation contains banks of relays, motor starters, limit switches and the sequence relays

Over-all view of automatic pallet loader showing cartons coming off production line and emerging loaded on pallets for later handling by fork lifts

Ram is here seen placing a two-row load on stripper plate. Cartons coming off the production line have been rotated before passing onto ram loader

COST of handling cartons is greatly reduced by a unique electrical device—an automatic pallet loader made by the Lampson Corp. of Van Nuys, Calif. The machine automatically controls the palletizing of different arrangements of cartons as determined by a stack pattern cartridge—the electrical brain of the operation. Packages are fed into the machine from the production line by means of accelerator rolls which automatically space the cartons. Limit switches stop and release cartons entering the machine in accordance with the sequence demanded by the stack pattern cartridge. Before the conveyor rollers pass the packages into the pallet loader, the boxes are rotated, if so required by the pattern. Cartons are counted by a photoelectric device.

After the proper number of boxes have been lined up on the package conveyor, they are pushed by a ram onto a steel stripping plate. When the proper number of rows are on the stripping plate, the ram retracts and allows the right number of rows to rest on the pallet, which has moved into position beneath it. The pallet itself rests on a "lowerator." When the stripper plate has discharged the first tier onto the pallet, the lowerator descends far enough to receive the correct number of succeeding tiers. When properly loaded, as predetermined by the stack pattern cartridge, the pallet lowers to the bottom, rests on a pallet conveyor and moves out of the machine. At the same time, a new pallet is released from the pallet hopper, moves forward to center on the lowerator, and is raised to position for another pallet load.

Each pallet load is regulated according to an A and B sequence set-up by the stack pattern cartridge, so that cartons are loaded with an interlocking strength. Mechanism of the automatic pallet loader must be precisely timed and controlled. Square D motor starters and limit switches were specified by engineers who designed the machine. The loader was originally developed by Production Aids Inc., but has recently been taken over by the Lampson Corp.

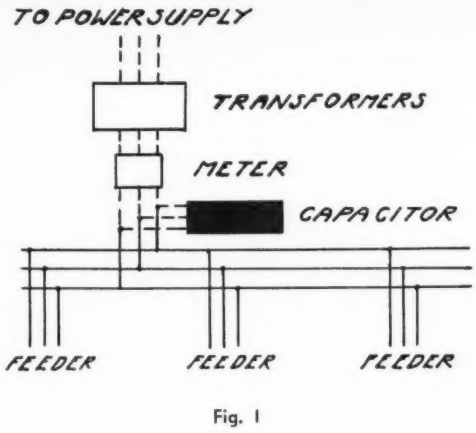


Fig. 1

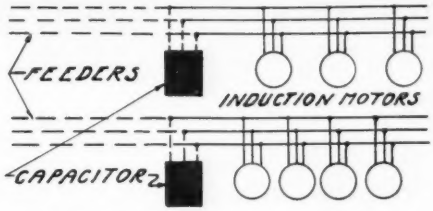


Fig. 2 (above)

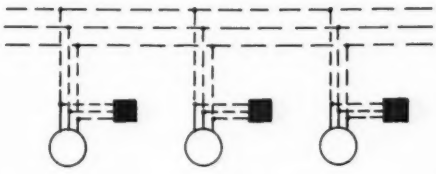


Fig. 3 (below)

Low Power Factor in Industrial Plants—

and what to do about it

W. C. King
Los Angeles

IX—Where is the best place in the plant to connect capacitors?

IN several of the preceding articles the statement was made that the power factor could be most economically corrected by means of capacitors. The question then comes up: Where and how should they be installed?

Let's assume that the power factor discount to be earned will justify the installation of 450 kvar. of capacitors. If we are interested only in the discount to be earned and not in correcting conditions within the plant itself, then we might as well install one large bank as shown in Fig. 1.

It should be kept in mind that the capacitor corrects the power factor between itself and the source of power. In making up the sketches, dotted lines have been used to show the conductors in which the current has been decreased by improving the power factor; the solid lines show those which are not affected.

We may have some feeders in the plant that are overloaded and running hot. Or there may be unusually long feeders with a rather high voltage drop. We can then split up our 450 kvar. into smaller racks and install them as shown in Fig. 2. This arrangement will improve conditions in the feeders but will not, of course, have any effect on the leads to the individual motors.

Plant conditions and method of operation are determining factors

We may have rather long runs to the motors; the best arrangement might then be that shown in Fig. 3. Or the way the motor is operated might make this the best method. An example of this is a portable motor-generator welding set; an individual capacitor may be mounted right on the set and connected to the motor. In this way we have a load operating at good power factor no matter where the unit may be moved in the plant.

The arrangement in Fig. 3 has the advantage that the capacitor may be connected directly to the load side of the motor starter. This saves the cost of the switches which are necessary when the units are connected as shown in Fig. 1 or 2.

Disregarding the cost of switches required by the various methods of locating our capacitors, the cost per kva. will be found to be practically the same whether the units are installed in one large bank as shown in Fig. 1 or divided into individual units as shown in Fig. 3.

With the capacitor connected directly to the motor terminals there is a possibility that, when the starter is opened, excessive voltage will be built up because of the motor acting as an induction generator with the capacitor acting to excite the motor field. This is particularly true if the motor is connected to a machine with a heavy fly wheel which will continue to operate for some time after the power is cut off.

Do not correct beyond unity PF at no load

In order to be on the safe side it is well to use a capacitor that will supply only enough rkva. to bring the motor to unity power factor at no load. This figure can be obtained from the manufacturer or the motor may be operated at no load and readings taken.

Tables are available from several of the motor manufacturers showing the capacity required to improve the power factor of standard motors to 90, 95 or 100%. These tables will save you a great deal of time if you are contemplating individual motor correction.

This series will conclude with another article on capacitors.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Utilization Data Sheet No. 58

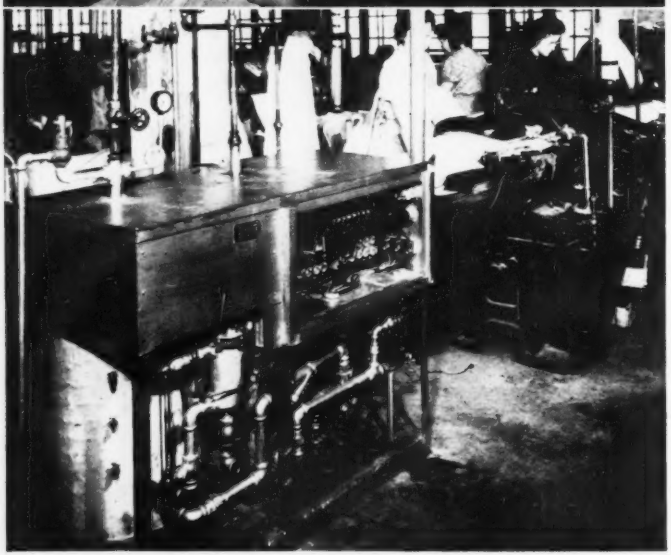
SUBJECT: Steam Generators and Water Heater

CUSTOMER: Broadway Laundry

SIZE OF BUSINESS: Thirty employees. One 8-hour shift, 5 days per week. Weekly gross sales—$2,000

SERVICE COMPANY: Pacific Power & Light Co.

DATA PREPARED BY: M. S. Glenn, light and power consultant



The Broadway Electric Laundry, 2635 N.E. Broadway, Portland, Ore., owned and operated by Albert S. Brown, is using electric equipment for the entire operation. This installation, begun in October 1946, was completed in February 1947.

Application and design of the steam generators can be observed in the photographs. Each generator is equipped with a condensate receiving tank, boiler feed pump, high- and low-water-level controls, low-water cut-off, condensate float control and water make-up solenoid valve. Minneapolis-Honeywell "Moduflow" control and modulating pressurestat so operate that each generator selects the least kilowatts for the desired amount of steam. A 1,500-watt copper-sheathed immersion-type heating element is individually encased in a $\frac{7}{8}$-in. copper tube; the number of such tubes in each steam generator being determined by the steam production required.

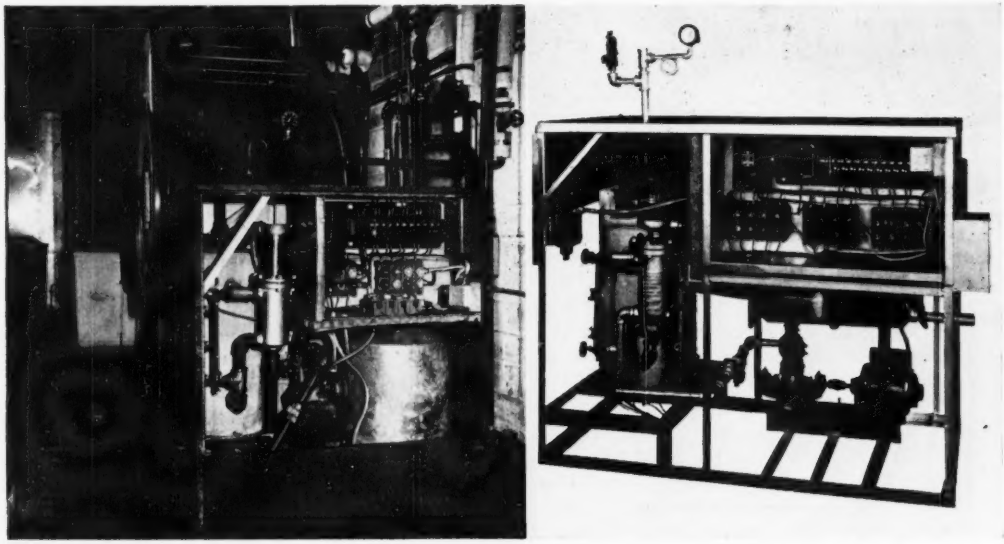
The use of electrical energy for the year 1948 for steam generation and heating water is shown below: (Maximum 30-min. demand by test was 196 kw.)

Jan.	48,900 kwh.
Feb.	47,700 kwh.
Mar.	48,700 kwh.
Apr.	46,700 kwh.
May	44,900 kwh.
June	47,400 kwh.
July	47,800 kwh.
Aug.	52,000 kwh.
Sept.	52,100 kwh.
Oct.	55,500 kwh.
Nov.	48,300 kwh.
Dec.	53,300 kwh.

The single-phase lighting and 3-phase power supplied through separate meters is not included in the above tabulation.

Brown states his over-all operating costs have not increased under com-

Steam for this large flatwork ironer (above) is supplied by a 54-kw. steam generator shown in the rear. Lower view shows a 45-kw. boiler that supplies steam to five garment presses



24-kw. steam generator (left) furnishes steam for two tumbler dryers in all-electric laundry. At right is shown a Vap-O-Lec steam generator with cabinet sides removed. Electric boiler may be seen in the compartment at left

plete electric operation due to direct savings in insurance, maintenance and boiler operating labor costs.

Future Plan:

A new building, adjoining the present plant, will house a modern dry-cleaning plant and the old fire-proof boiler room will be used for cleaning. An additional 100-kw. generator will operate the presses in this plant. The present water heater will be replaced by another automatic unit rated at 54 kw. and connected to a 1,200-gal. storage tank.

Customer Letter

Extracts from letter of Albert S. Brown, owner, operator:

"The installations [of electric steam generators] have made our plant decidedly more flexible in operation and, while the direct fuel cost will be slightly higher than the oil-fired [40-hp.] boiler, we find that we have more steam up to our equipment than ever before.

". . . we are able to more effectively control the operation of any particular group of presses or other equipment with the net result that our production has been increased to the point where we have the alternative of reducing our force by two girls or being able to accommodate more volume at no increase in productive labor cost. The saving in labor alone will amount to more than our former oil bill.

"We also find that, due to the extremely fast heat-up of these generators, we can save not less than three-quarters of an hour [of engineer's time] in the morning . . . this time is paid at the time and one-half rate . . .

". . . Compactness is another very desirable feature. Our oil-fired boiler room contained 450 sq. ft. of floor space, as compared with the 27, plus the formerly unused [stairway] space. The space formerly used for a boiler room is now being converted to a dry-cleaning room for the dry-cleaning department we are installing.

"The generator for the flat-work ironer was placed under a stairway . . . The other three [steam generators] have been placed throughout the plant and occupy 27 sq. ft. of floor space.

". . . It pleased us to receive many compliments from the residents of this neighborhood . . . because of the elimination of the smoke nuisance and the unsightly smokestack.

"To sum up our benefits, we are getting more steam, a cleaner plant, more efficient operation, more production and, therefore, lower costs, and a flexibility that we never before enjoyed. The savings far outweigh the small additional fuel costs and we are happy that we made the decision to go all electric."

Electric Steam Generating and Water Heating Equipment:

All generators wired 3-phase: 230 volts
(Saturated steam produced at 100 psi.)

Steam Generator	Connected Load	Supplies steam for:
No. 1	24 kw.	Five shirt presses
No. 2	54 kw.	One 120-in. five-roll mangle with two heating rolls and one 54-in. handkerchief mangle
No. 3	45 kw.	Seven shirt and garment presses, plus a space-heating radiator for office
No. 4	45 kw.	Battery of eight heavy-garment presses, a starch cooker and a soap cooker.
No. 5	24 kw.	Two 30x26-in. tumbler dryers
No. 6	24 kw.	Water heater: This unit, similar in design to the electric steam generators, is connected to a 650-gal. storage tank constantly maintained at 195° F.*
Total	216 kw.	

*During the day operation, waste water from one 42x60-in. two-pocket washer, one 36x60-in. two pocket washer, one 36x54-in. four-pocket washer, and one 30x36-in. one-pocket washer, is piped to a heat exchanger coil in a 100-gal. preheating tank. Temperature of incoming city water is raised thereby from 47° to 80° F.

ELECTRICAL WEST

Employees vs. Customers

"THE tug-of-war is on between employees and customers," as one wise observer has put it. "Customers delay buying believing that prices are coming down, but employees who make the goods want more pay, shorter hours, vacations and pensions. The question is, which can outlast the other?"

This sage observation recognizes a fact that seems to have been completely overlooked by union leaders. Their tug-of-war is not with management but with customers. Management is the salesman for the product of employees' labor. If management cannot sell that product because customers won't pay a high price for it, transaction of business stops and so do jobs.

Because its immediate and urgent needs have been filled, regardless of price, the public will go no further in price increases. This should be a sign that any sensible labor leader could see. Most managements of businesses see it and, if they can, will take a stand at this level. If they are forced beyond it, they risk pricing themselves and their employees out of business.

Business Activity vs. Sentiment

BUSINESS activity is far better than business sentiment. Almost all of the gages of commercial and industrial conditions contradict the sentiment of most business and industrial people. Furthermore examination of the basic economic facts refutes the pessimism that afflicts the business world. One inference that might be drawn is that businessmen have lost confidence in the U. S. economy. Or worse, that they have lost faith in their own competence and ability to meet the challenge of a moderate business recession.

Reconcile business sentiment with such facts as these: Total disposable income after taxes is 7% ahead of last year. Real consumer purchasing power (after allowances for price changes and taxes) is 6% ahead of 1948. Total discretionary spending power (the amount left after deducting food, shelter and clothing expenditures) is four times the 1940 figure. Accumulated savings are three times the 1940 total and have twice as much purchasing power at today's price levels. Employment has been at an all-time high and average weekly earnings have been 5% above last year. Retail sales are only 3% below the all-time high, which was almost three times the 1939 figure.

American business has entered a normal phase. It is in a buyers' market, which until 1941 was a normal market—the kind of a market in which business has always prospered. The trouble is, as one forward-looking business leader has put it, "businessmen themselves are not doing enough to convert purchasing power into purchases." That goes for the electrical industry. We need strong doses of the competitive selling zeal of earlier days. Without it, business activity might catch up with business sentiment. That would be fatal.

Is This Competition Legal?

CONSTITUTIONALITY of the federal government's commercial power operations has long been a moot point. Business-managed power companies have never been able to test the legality of the government's competing power activities, because the federal government cannot be sued without its consent. Such consent has never been given. Now the government itself has provided a loophole.

Public Service Company of Colorado in its answer to a USBR suit to settle claims for Colorado River water has asked the federal court to pass upon the legality of the bureau's proposed Colorado-Big Thompson transmission network. Also the power company asks for an injunction to restrain the USBR from building competing transmission facilities. At issue is interpretation of a loosely drawn resolution, Senate Document 80, authorizing construction of the project. The company contends that this document does not authorize the construction of the competing lines. Also it claims that such construction will deprive it of property without due process and just compensation.

The company cites its own willingness to cooperate with the USBR in marketing Colorado-Big Thompson power. It will purchase any and all power, firm and dump, at a cost not exceeding that of equivalent energy. It will curtail its own steam generation to provide an immediate

EDITORIAL VIEWS

market. It will pass on to its customers all savings resulting from the purchase of this power. It will build any necessary transmission facilities. Finally it will coordinate its operations so as to produce the maximum amount of firm power from the project.

The Colorado utility appears to have a potentially strong case. The issue is clear-cut.

Fair Play for Fair Trade

AMONG property rights once respected was the right to one's good name and trade-mark. But under today's unmoral philosophy of seizure of anything of value belonging to someone else, even one's trade-mark is under attack. As a protection to the small merchant, the Robinson-Pattman Act permitted a manufacturer to protect his trade-mark and his investment in advertising and in product design by allowing him to control the price at which his product would be sold. This act was supported by Fair Trade laws in 44 of the 48 states. Now this law and the idea of "fair trading" of a trade-marked product is under attack both by some members of the Federal Trade Commission and some senators and congressmen. And the entire subject is being made a congressional inquiry for the next year or so.

Main contention against fair trade protection is that it prevents price cutting which would give consumers products at lower prices (regardless of whether it destroyed some businesses thereby). Greatest pressure for repeal of such laws comes from large chains and big department store syndicates who use nationally known, trade-marked brands at cut prices as bait to attract customers to whom they can sell large quantities of other merchandise at profit ample enough to absorb the losses they take on the trade-marked brands. The small merchant who cannot manipulate his merchandise so as to rob Peter to pay Paul cannot compete with such tactics and goes broke.

If the anti-trust laws are designed sincerely to eliminate monopoly, certainly the amendment to them permitting fair trade protection is a step in that direction. And if a manufacturer decides to distribute his brand in that manner, taking the risks that unbranded or competitive lines will cut prices below him; if he feels that his relations with his dealers is worth this risk, certainly it is his property right in his brand to do so. He can only control his own product, not that of others.

Those who believe in the idea of fair trade must let their congressmen know how they feel and why. It is a struggle to uphold a right to one's most valuable asset—his good will.

AN employee works for two salaries —the actual sum of money he receives in the pay envelope, and the possible salary that he, as an employee, can give himself. This second salary—the "invisible salary"—consists of increasing skills, expanding experience and broadening character. But this salary does not accrue to the employee who measures his daily output in the dollars and cents that he gets. The wage earner who takes great pains to not work beyond his salary is practicing a type of dishonesty—a dishonesty towards himself more than his employer. The craftsman who cheats himself in the quality of his daily work can never regain this loss. The quality of his daily work will determine the quality of his life. If he insists on demanding of himself only the highest type of work, he will find himself demanding and getting the best in other things as well. The employee who trims his work to fit his paycheck will find himself deliberately shirking on his job. This must cut short his own growth, for the qualities of leadership, initiative, planning ability, ingenuity, resourcefulness and inventiveness will die for lack of practice . . . The paycheck is of course important but it should not be allowed to become a rein on the employee's advancement. The workmen who pay themselves the invisible salary of fine quality of work, enthusiasm and determination will find that this type of coin will soon attract the other. But more than money, they will go through life as complete men, and from their ranks will come the leaders.
—Frank Wiggins' Trade-Technical School "Tradewinds."

Mrs. John Crawford, left, one proud winner, and her sons

Promotion banners and display as used at utility office

How to Sell Ironers — San Diego Style

THERE'S plenty of reason to believe that San Diego County will be one of the "hottest" ironer selling areas in the country from now on. As the result of a cooperatively sponsored Ironer Demonstration Week, May 2 through 7, more than 8,000 women in that area sat down and watched a professionally presented demonstration of an electric ironer.

The ironer compaign followed the basic pattern of San Diego's smooth-clicking appliance promotions. Spark-plugged and managed by the Bureau of Radio & Electrical Appliances of San Diego County through its secretary-manager, J. Clark Chamberlain, the promotion was the joint effort of the bureau, the San Diego Gas & Electric Co., thirteen wholesale distributors of ironers, 103 retail appliance dealers—and the buying public of San Diego County.

The idea for Ironer Demonstration Week had been latent since the close of the bureau's nationally famous Ironer Institute in 1938, and began to jell again as dealers acquired full stocks of appliances with the coming of 1949. By March 1, when the first teaser notice was given that an Ironer Demonstration Week would be held, a committee of three dealers and three distributors, chairmanned by Aubrey Thompson of the H. L. Benbough Co., was working out the details with Clark Chamberlain. The over-all plans sought and received the following basic elements of cooperation:

From the utility, San Diego Gas & Electric Co., which had worked closely in formulating the campaign plans, the full responsibility for creating and financing the advertising and publicity. Through the utility advertising manager "Frosty" Raymond, his display manager, Dave Evans, and publicity manager, Roy Dickinson, nearly $3,000 worth of advertising coupled with publicity releases were issued under the name of the bureau. This cooperation by the utility brought the news of the ironer demonstration to every family in San Diego County through full page advertisements in three San Diego daily newspapers and in 26 county weeklies on the Saturday preceding the campaign. Smaller copy was placed in the dailies each day of the campaign, with a 3-col.x10-in. display advertisement on Friday in the dailies. Supplementing the newspaper advertisements were daily radio announcements, including the daily winner presentation over KCBQ every morning. Through the special cooperation of utility president, A. E. Holloway, the entire first floor of the electric company building was turned into a display room for the 13 ironers that were donated as prizes.

From the distributor or manufacturer's agent for each brand of ironer actively promoted in the area, was asked the following: (1) that each donate one ironer to be used as a prize; (2) to determine which of their franchised dealers was or could be equipped to give ironer demonstrations to everyone who entered their stores during the campaign week; (3) take necessary action to see that the dealers and their staffs were trained to give ironer demonstrations; (4) see that the point of sale campaign promotional material was delivered and put to use; (5) supply dealers with sufficient brand promotional material to help them build prospects from the demonstrations.

The distributors and manufacturers' reps responded with cooperation that produced one each of the following—ABC, Apex, Bendix, Conlon, Easy, G-E, Horton, Hotpoint, Ironrite, Simplex, Speed Queen, Thor and Universal—ironers as prizes for the campaign. Frigidaire and Nineteen Hundred gave full cooperation to the whole campaign, but through technicalities were unable or late to donate ironers. Sear's, long-time active supporter and participant in bureau activities, was listed in the original plans as a retailer rather than the dual capacity as owner of the trade-name "Kenmore" and was left out of the original plans through no fault of Sear's management.

Distributors and manufacturers' agents cooperated with the bureau's program by providing special pre-campaign ironer demonstration schools. Each distributor held his own classes, and the manufacturers brought in their regional home economists to train retail staffs. As a result, several hundred appliance dealers, dealers' wives, salesmen, salesmen's wives, and other store personnel received expert training in the art of giving ironer demonstrations.

An authoritative opinion from a member of the industry was: "By the time the ironer demonstration week started, there was no section in the world where such a large percentage of the retail appliance trade had become experts in ironer demonstration." There was little to dispute him. But the suppliers' cooperation did not end there.

To assist their local organizations

Ford's TV newsreel crew records show

the following regional men spent a week or more in San Diego—George Williams (Conlon); Bill Kuhn (Easy); Frank Wallace (Horton); Gordon Wilkins (Ironrite); Paul Chalfont (Thor). Then, recognizing the strain that would be put on their local retail organizations in spite of the expert training that had been given, manufacturers sent 12 regional home economists to work in cooperation with the department stores and the larger retail appliance dealers during the demonstration week. Cooperating in this venture were Bendix, Easy, G-E Appliance, Ironrite, Simplex, Speed Queen and Thor.

In further cooperation with the bureau and its committee, available distributors and manufacturers' agents met in emergency session on March 31 to report on their individual progress and to attend a round-table discussion in which ways of cooperating among themselves as well as with the bureau were covered. Attending were: Messrs. Babbitt (Universal); Porter (Speed Queen); Peterson (Simplex); Fisher (Ironrite); Kuhn (Easy); Yohanis (Hotpoint); Winder (G-E Appliance); Bornstein (Thor); Perkins (Apex), and Walker (Frigidaire).

The cooperation asked of the dealer by the committee for Ironer Demonstration Week was, on the surface, very little—"(1) willingness to equip yourselves to demonstrate any and all makes of ironers which you handle, throughout the week; (2) your cooperation in displaying the uniform window or store signs of the campaign—to be furnished by the bureau at no cost to you; (3) willingness to mail filled-out contest stubs to the bureau each evening; (4) your cooperation in promoting your own store activity in every way possible during this week; (5) to make Ironer Demonstration Week profit your organization individually through a method of recording the names and addresses of all contestants for future use and by developing a method of following up all potential ironer purchasers."

The cooperation given by the appliance dealers was considerable and effective. Of the 123 dealers who were considered to have adequate facilities and personnel to meet the conditions of the campaign, 108 gave full cooperation . . . of the county dealers participating, 28 registered from 50 to 100 demonstrations, four gave between 100 and 200 each, and two gave more than 200 demonstrations during the week; of the 54 participating city dealers, 23 had from 50 to 100 ironer demonstrations each, seven gave between 100 and 200, and five dealers gave between 200 and 600 demonstrations each. No public interest in the ironer demonstration?—on the first day, 1,205 women asked for demonstrations, and on the next day, 1,241 more came in, and on Wednesday there were 1,407 people watching a professional ironer demonstration.

Keynote in promotion of the Ironer Demonstration Week was the list of 13 ironers which were given away free—two each day and three on the closing day, Saturday. To compete for one of these valuable prizes, the contestant had to sit down and witness a professional demonstration of an ironer before she could fill out a card. In that way, the committee and the dealers were able to overcome the biggest initial hurdle in the selling of ironers — enabling the women to see that they are more practical and more easy to operate than they have thought.

While the results of the San Diego Ironer Campaign exceeded by far all estimates of success, it proved vital points about the appliance business—during the campaign the sales of all major and traffic appliances jumped to new highs as a result of the floor traffic created by the ironer campaign. And even while the prospects had an opportunity to win a free ironer, they bought ironers at a rate far in excess of the San Diego County high, 45-a-week record.

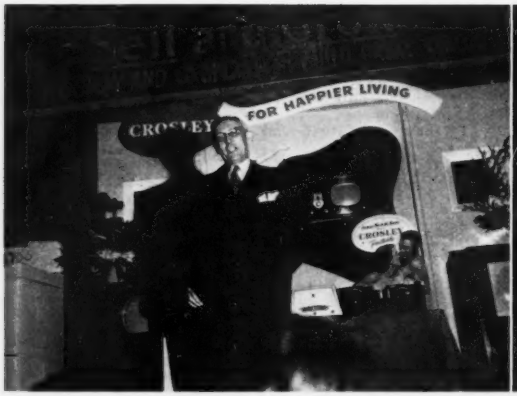
Most important to the industry, above the conclusion that ironers could be sold if they received proper sales treatment, was the dealers' acknowledgment that appliances of all kinds could be sold profitably in this buyer's market if the proper amount of promotion and salesmanship were added.

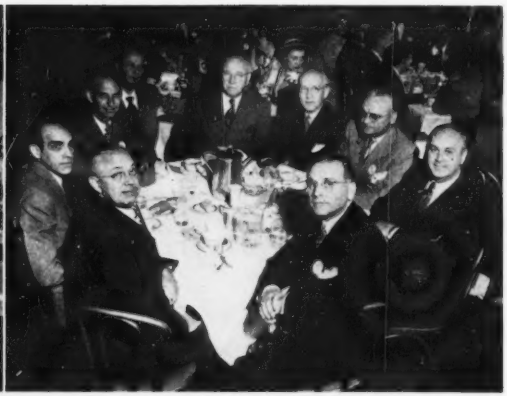
G-E Pays Off on Gold Rush Contest

Pay off on General Electric Appliance Inc.'s Gold Rush Campaign of '49 was a ten-day trip to the East Coast for 100 southern California G-E dealers. Headed by Stephen B. Maher, general manager of G-E Appliances, Los Angeles, the winning dealers boarded a special G-E Gold Rush express train for a conducted tour of G-E factories in eastern cities.

The trip climaxed a four-month sales campaign launched the first part of this year by G-E Appliance, offering a free trip to the top 100 dealers who realized the biggest percentage of their six-month quotas in four months.

Tour of the East Coast as guests of General Electric Appliances, Los Angeles, climaxed the G-E Gold Rush Campaign of '49 for 100 southern California dealers including, from left to right: Frank Silver, Millirons Department Store; B. Basch, May Co.; J. Wilson, Electra City; S. B. Maher, general manager of G-E Appliances; G. A. Lloyd, sales manager of G-E Appliances; R. Stowers, Pasadena; B. Notthoff, Notthoff Plumbing Co., Los Angeles; N. Perrin, Los Angeles





Guest speaker, William A. Blees, general sales manager of Crosley (left), warned dealers not to overstock on merchandise at the San Francisco dinner meeting for 600 northern California Crosley dealers, put on by California Electric Supply Co. At right: Speakers and hosts at the Blees dinner party included (left to right) N. B. Dinkel, Crosley regional representative; Glenn Taylor, Crosley regional manager; R. K. White, Crosley assistant general sales manager; W. A. Blees, Crosley vice-president and general sales manager; L. B. McDonnell, CESCO president; M. R. Rodger, Crosley assistant general sales manager, Western division; and E. L. McDonnell, vice-president

Better Discounts Coming — Crosley's Blees

"OVERPRODUCTION is the basis of all business troubles. It not only causes price cutting but an unstable market," William A. Blees, vice-president of Avco Mfg. Co. and general sales manager of the Crosley Division, told some 600 dealers gathered in San Francisco to hear about the Crosley outlook and see the fast-moving show that Crosley had previously presented in Phoenix, Los Angeles and Portland. Northern California dealers were guests of Crosley distributor California Electric Supply Co. at a dinner meeting on June 30.

Blees warned dealers that excess inventories can take place at the manufacturer, distributor or dealer level. To avoid price cutting, production must be controlled. He advocated that dealers buy only a 30-day supply of merchandise to avoid overstocking. If we are to control inventories from the manufacturing end, Blees said, we must have accurate dealer figures on stocks and monthly sales.

"The business outlook is good. Conditions will be stabilized by Christmas, when labor negotiations in the steel, automobile and coal industries will be settled; management will have washed out its inefficiencies, excessive inventories will be liquidated and Christmas buying will be heavy. All will have a stabilizing effect," Blees predicted.

Encouraging word to dealers was his frank statement that dealer discounts are too low. Every new piece of merchandise Crosley introduces will carry with it a higher dealer discount, he said, but it will take dealer volume to do this.

With animated displays and a sales pitch from several Crosley West Coast promotion men, a lively show featuring the 1950 range and new 7-cu. ft. Shelvador refrigerator was presented at the dealer meeting. Developed by R. K. White, assistant general sales manager, the animated displays will be available for large exhibits and fairs.

C. E. Germaine, Crosley regional manager, briefed dealers on the selling points of the Crosley kitchen freezer and new Shelvador. "Don't sell the freezer short," he said. "Give it more thought, it will mean dollars to you."

Crosley's Shelvador EMA-7 "spoke for itself," describing its trigger-action door latch, full-width freezer with 26-lb. frozen food capacity plus food crisper, which will sell at $239.95.

California Electric Supply Co.'s sales manager, Ted Rising, announced a promotion package for dealers to tie in with refrigerator advertising that CESCO is running in newspapers throughout northern California. The complete package contains an accordion strip for dealers' stores showing the amount of food that can be put into a Shelvador, cardboard backing for the full-page ads and a suggested window display layout. In addition CESCO is giving dealers a listing in the newspaper advertising. Cost of the package to the dealer is $7.50. By mailing a picture of his store window to CESCO, a dealer will be refunded $5 of his initial investment. A prize of $75 will be offered for the best window and $25 for the second best.

Mel Rodger, Crosley assistant general sales manager, emphasized the potential radio and television market that is ahead for electrical dealers. "Get into it, display it and promote it," Rodger urged.

"Selling time," said R. K. White in a humorous sales talk to the dealers, "is the only time that pays dividends." If you can actually be selling three hours a day, five days a week, you'll make a profitable return. But before you can sell, he emphasized, you have to know where you are going, who you are going to see and what you are going to say.

● IMMEDIATE electric service for new occupants of old houses is obtained merely by closing the switch and mailing a prepaid postcard application form to Sacramento Municipal Utility District, under a new plan announced by J. F. McCaffrey, general manager. As premises are vacated the meter reader takes a reading, leaves the card. The simplified system will save $5,000 annually by eliminating 600 trips to unlock meters. More important to moving-harrassed tenant will have electric service without delay and a trip down town to sign up.

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

August 1949 ©

A Salesmen's Market

Lots of dealers and buyers, eager for new things to sell, swarmed the San Francisco market of Western Merchandise Mart, Aug. 1-5. Interest is attributed to low dealer inventories and pick up in retail business since June with prospects of an active fall and Christmas trade. Los Angeles market, while mostly in furniture, little in appliances, was active too, some appliance distributors reporting substantial orders. San Francisco Mart appliance floors 4 and 5 were busiest in the building.

Brisk buying

New things were chiefly in details or refinements or return of prewar lines not before reintroduced. Deals with give-aways and other bait were plentiful, maybe catching it from the radio quiz shows. Television sets were all over the place, radio taking a rumble seat in the cold. In white goods it is going to be a battle of the brands, with lots of advertising artillery.

New - in white goods

What was new? Here are a few: Electric ranges — L&H double oven, six element range; Admiral range with rotating spit in oven for broiling; Montag range from Portland in 7 models, shown by General Sales Corp.; Crosley talking range that gives its own sales pitch by transcription; Gibson, ditto. Refrigerators — Admiral 9.6 dual-temp with sterilamp; Presteline 9 ft. refrigerator also with germicidal lamp to sell for under $300. Home freezers — new full line of Kelvinator models; Whiting with sanisell insulation that gives more space inside for less floor space outside; Westinghouse's new upright freezer. Washers — Bendix new Economat that sucks out the water instead of spinning it out; Westinghouse new lower priced round model; General Electric with a new, rugged, apartment or do-it-yourself commercial model with or without coin meter; Also a new console low priced roll ironer. Disposal — G-E has a new shortened model for mounting where drain outlet is high, also an adapter.

- in table appliances

Table appliances — Nesco's full line of roasters from deluxe cabinet job with timer, clock, heat control and push button lid opening down to 1 qt. size, includes a new 18 qt. model at $26.95, glass dishes $3 extra. Cliff Russell also showed attractive new Popex popcorn makers; Westinghouse had nifty table grill with automatic controlled heat on which Lois Ferris made delicious toasted sandwiches; also a new automatic coffeemaker; G-E has a new pop-up toaster, an automatic waffle-iron and grill and a new three-beater mixer; Manning Bowman is back in traffic appliances with a variety of table appliances.

In radio and TV Packard-Bell staged a showing of its full line in the Green room, its president Herbert Bell, vp Joe Spain and Ken Johnson, sales manager, meeting dealers. Bill Miles, distributor, sponsored the event. . . Basford showed new Zenith 16-in. models, is standardizing on 12 and 16 in. tubes. . . G-E has a kiddie line of record makers, record players and combinations; some novel table model TV sets and consolettes with either 10 or 12-in. tubes. Many other had special features also. The trend is to bigger pictures in TV.

- in radio & TV

Jim Nance, president of Hotpoint, was the electrical speaker on the Appliance Trade dinner, Wednesday night of market week. In a talk that reestablished the value of salesmen to make the appliance business prosperous he said a mouthful — "It was adventurous and take-a-chance guys, not social security seekers who made America," and the business needs twice as many as it has now to ring the door bells and sell the better standard of living that is America. Bill Lee of Sherman-Clay was MC for the packed dinner meeting.

Salesmen's champion

A directive from the Navy in Washington closed the commissaries in larger cities and banned "special orders" from ships service and PX by which to buy unstocked luxury items — including appliances. Of course the Fleet Reserve Assn. and similar long privileged groups raised a storm of protest. Even excise tax may be put on the hitherto exempt items still sold in PX's.

Reins on PX

Gleaned from speakers and manufacturer's reps. at the fast-stepping Bureau of Radio & Electrical Appliances of San Diego County summer conference, San Diego, July 27, (to be reported in full next issue) were these tidings ---

Big conf.

Kelvinator's Nels Barnett said they weren't on allocations, they were sold out for the third time in 60 days. 45% of the volume is in models above $300. Who says the public wants to buy cheap?

"Sold out"

Bob Covell, Bendix man for Meyberg Co., claims the new Economat is going big and has put new life in the whole washing machine business.

New interest

Robert Morrill, Landers, Frary & Clark, says there'll be a new full sized Universal vacuum cleaner soon to sell at $49.95. Said also the two automatic coffee makers are big sellers.

Lower bracket

Maytag will introduce its new automatic by districts or territories, says Henry Mumma, and so they won't be available everywhere just yet.

By districts

Cory has two new automatic coffee brewers, said Lester Neilson, one at $19.95, the other $28.50 plus tax. A new policy on all glassware including replacement, breakage, etc., is soon to be announced.

What's brewin'

Deepfreeze has something new cooking, it was intimated by John Watts, but said even he did not know what it was. Also announced was new distributorship in Los Angeles of Deepfreeze, Ray Thomas Co., and that Lou Swenson would be its general manager. Shortly Sherman is semi-retiring as a manufacturer's rep. so Sherman-Swenson Co. dissolves.

Or freezin'

Chicago Electric is introducing a new deluxe Sunkist juicer which has a new wrinkle, an oscillating type strainer with fast cutting edges that cut up pulp but reject seeds and fiber and deliver 30% more juice, according to Ben Davis. Will sell at $19.95. Another new item this fall will be a food mixer to have a 60 oz. bowl and which will merchandise at $14.95.

Pulp chewer

Arvin products, such as fan heaters, automatic irons and radios will give longer dealer margins under a new price adjustment, according to Earle Rogers, Pacific Coast representative. — More margin

Veteran electric range maker Al Lindemann announced that Ray Thomas Co. would distribute his L&H ranges and water heaters in southern California. Bob Jones is the San Diego representative. Two new super-deluxe electric ranges are in the 1950 line, with double full sized ovens whose elements are recessed in top and bottom to give full 17 in. clearance; six top Monotube elements with varispeeds which provide 900 different heats instead of 5 or 7. — Try and match this

Emerson Radio has a new flexible dealer inventory plan to avoid loading its dealers and to protect them from price changes. — Adjusts

Tom J. McIntire, who probably had the first home freezer made and has been a most eloquent advocate of home freezer benefits as representative of Yorkville Paper Co., has now become home freezer specialist for the U. S. Grant Co., distributors of Hubbard freezers in southern California. — Paper to profits

Steve Maher's General Electric Appliances Inc., Los Angeles, as distributor, is recruiting and training salesmen for G-E dealers by means of a unique program (Details later). . . Also is springing a new G-E portable dishwasher by means of a big kickoff dinner, Aug. 4. The portable, like a washing machine, is a plug in, hose connecting device that will sell to any kitchen. — New portable dishwasher

Frigidaire really held revivals of its prewar dramatized classics, with a professional, fast, peppy, sales driving show. Made the circle of the West with shows in Salt Lake City, Los Angeles, Oakland, Portland, Seattle, Spokane and Billings. Bill Smith and John Wills, factory men, toured with the show. — Proves everything

George Newlin is now Knapp-Monarch representative in southern California. He was formerly General Mills man for the area. George Gillespie, San Francisco district manager, takes over. — Change

Study of six months sales trend will soon be issued by Southern California Edison Co. based on reports from 65% of the dealers in the area served by it, says Henry Rice. Sales of the past three months have been up and the year may end with total sales only less than 20% off last year. Edison Co. will follow its evaporative cooler and home freezer advertising promotion with a big range and water heater promotion in Sept. and Oct. — Trend and promotion

Television highlights: The FCC opened up a whole new front of speculation by proposing 42 new channels in the ultra high frequency band; with present 12 would make 54 in all, permit TV stations in great number of smaller communities. Hearings on this will be held in the fall . . . Sylvania, which made TV sets for Sears, will soon market a set of its own. . . Predictions are that within two years TV sets will have built-in antenna. . . Stanford Research Institute has announced a simple converter to bring UHF television in on VHF (present) TV channels. Project was sponsored by John H. Poole of Long Beach who will have an experimental UHF station there. . . Hoffman Radio will sponsor TV casts of UCLA and USC football games this fall in Los Angeles. — The video picture

O. B. Wilt, at San Francisco Merchandise Mart, is now representing these new lines -- Magic Defroster, White Cross traffic appliances, Willard Mfg. Co. wired kitchen utility tables. H. C. Barter has joined his organization. — New lines

A. D. Wunder Co. will now represent Tracy kitchens and sinks in central and northern California, according to Adrian Greenberg. Also Cal-lite steel utility cabinets. Dick Schattinger, distributor, Fresno, will represent the A. D. Wunder Co. in that area. — And more

John R. Weber will contact accounts for Thermador Electric Mfg. Co. of Los Angeles in Washington, Oregon and northern parts of Idaho and Montana, as its sales manager of the Northwest division. Weber was formerly with W. W. Wheat and Son. — Named

Southern California Edison Co. in cooperation with its dealers has opened an Electric Living Center at Alhambra with weekly cooking demonstrations headed by Miss Pauline George, home economist. Dealers are supplied with invitations to extend to buyers and prospects in their area. — Invite

Northern California Electrical Bureau's Electrical Living promotion was quite a success with nearly 9,000 entires submitted, representing 10% returns. Contest winners: First place - Georgia Bradshaw, San Jose; Second - Philip S. Miller, Quincy, Calif.; Third - Mrs. M. J. Hunter, San Francisco; Fourth - Mary K. Pena, Pacific Grove. San Francisco Unit of the bureau awarded 17 prizes for its window display and salesmen's contest held in conjunction with the campaign. — Contest winners

Association of Appliance Dealers in Seattle is trying out something new -- meetings in the morning before work. First breakfast get-together on July 12 featured Allen R. Potter with a talk on "Where is Your Market?" — Early in the morning

Charles P. Connally, Jr., the new Western division sales manager of Florence Stove Co., has opened sales headquarters office and showroom at the San Francisco Mart displaying both electric and gas ranges as well as heaters. — Display

Los Angeles TV sales continue to grow. June sales of 13,181 brought TV ownership to 153,581, a 9.4% increase in one month. . . In spite of the furniture store and warehouse strikes affecting TV sales in the San Francisco area, June figures reached 483, about equal to May. Total San Francisco sales to date — 3,635. — TV review

American Central Division of Avco Mfg. Corp. is supplying its dealers and distributors with a monthly news bulletin called Kitchenotes, with a column on business conditions and illustrated stories on merchandising schemes. — News

Westinghouse's latest kitchen ventilating fan, with a 10-in. fan and steel window panel adjustable for different window widths, can be operated as a window exhaust fan or snapped out of its window panel and used as a portable circulating fan. — Snaps in or out

Zerega-Thompson of Seattle now handles distribution for Motorola Radio & Television in Washington and Alaska. — Appointed

ELECTRICAL WEST

Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © AUGUST, 1949

When Competition Gets Tough—

Sell one line well

Says

Ken Hampton

TO meet increasing competition one of the first things to do is to be sure that you have **full confidence** in the merchandise you offer for sale. You and your organization must be able to sell with the **conviction** that you are offering your customers the best.

Basically your merchandising program must start with the products you offer your customers.

You have an obligation to yourself and to these customers to buy and offer for sale well-designed, easily serviceable equipment that they can readily install and easily use.

There are good manufacturers in the electrical business. They build **customer advantages** into their appliances. You need to know and sell these advantages in order to meet competition and keep your business volume and profit up.

You should associate your name with the name of a well-known brand whenever possible.

It is undoubtedly best that you choose only one. True, you may not want to offer the same factory's products in each group, e.g., the same factory's refrigerators and radios, but by all means offer only one factory's products in any one group and make that offering one you and your organization are proud to sell.

Examine the line you offer for—

1. Its **performance** in your town.
2. Its **quality** compared to similar products being offered by competition.
3. Its **known brand name** preference in your area.
4. The **reputation** and **ability** of the manufacturer to make good on the **guarantees,** to furnish you with service tools and parts, and to keep supplies available near you.

5. **Beauty** and **utility** of design compared with competing products.
6. **Ease of handling** without damaging and installing without undue expense.
7. **Sturdiness in use** and **ease of repair,** so that after the sale, expense both for your customer and your firm can be kept at a minimum.

Having chosen the products you are to offer, then you and your organization should **learn everything possible** about them. Just how good they are. Why are they good. Why should your customers use them, etc.

These poducts then can be sold by your organization with the sincere conviction that they are the best products for your customers to own. On this conviction you can build the enthusiasm that is essential to successful competitive selling.

There are many reasons why you should offer only one make of products for sale in your store on today's market. There is in today's market a preference for quality, brand name, and an acceptance of new design our industry has never before experienced. All manufacturers are offering improved products. You and your sales force cannot possibly know as much about several products built by different manufacturers but serving the same use as you will if you concentrate your time and effort in learning all about one line of products.

Since a convincing sales talk is built on a thorough knowledge of the product this is very important. You sell best those products which you yourself like best. This is true of all of your salesmen. By concentrating on one line you build selling strength within your organization.

You will get more sales help from the wholesaler you buy from if you concentrate on the manufacturers products he offers. You will give him more business. This means you will be better regarded by him and you will have more of his time and attention devoted to helping you merchandise better to meet competitive conditions. You will get the benefit of his best ideas.

There are other advantages; it gives you less investment in floor display and warehouse stock. This means less interest expense, fewer markdowns, fewer mistakes in deliveries, better use of floor and warehouse space, etc.

You can keep more adequate quantities and better model assortments on hand thus insuring quicker deliveries to customers.

Above all you present a united front to both competition and customers that enables you to use the full force of the manufacturers advertising. You can implement that force with a concentrated presentation in your store that will ring true and close sales.

Then there is a great advantage from one line concentration in word-of-mouth advertising by users. You certainly do not get near the user advantage from two women debating before friends the advantages of two competing manufacturers' stoves your firm has sold them that you would if they were both enthusing over the same product.

Further, you save your own time in not having to see salesmen from many different companies. And you save office time, warehousing time, servicing expense, etc. by not having to do the extra work involved.

Basically you will do a better, more profitable job of operating your store if you will concentrate on one line of products and take full advantage of their national advertising and promotion plans to be their leading store in your town.

(1) Concentrate on one line and (2) lean on the wholesaler's field men to train your salesmen and your service men (3) to know all about the consumer advantages of that product (4) to help you sell more appliances and (5) make more money. It is one of the surest ways to best meet 1949's competition for customer dollars.

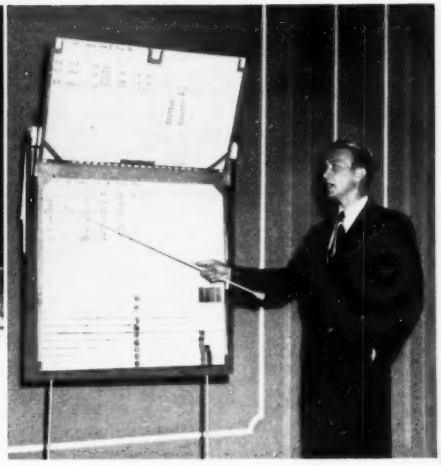
The Housewife Doesn't Want to be a "Sucker"

Price cuts have created a "wait and see" attitude on the part of buyers. The American housewife is a realistic purchaser. Even though housewives have a need for new equipment, have the money to buy it and even the desire to purchase, they will not buy until they are sure they will not appear ridiculous for having spent their money; that is, if the price drops and their neighbor buys it at a lower price.

At the moment, they appear to be enthused by the price adjustments made and they appear to be waiting to see how much further the prices will go. This "wait for more" attitude is perfectly realistic and is being followed not only by the housewife but by many purchasing agents and commercial buyers. The only remedy, of course, is hard selling of good products at a fair price.

All customers are buying carefully. They are asking what they are getting in dollar value for the money they spend. This careful buying is leading them to shop from store to store. This means an added opportunity to the retail dealer to tell his sales story to the customer. Quality, reputation and sound salesmanship play a bigger part in today's market than they have for many years.

Wendt



Brundage Balzari

Appleton

"Tighten Wisely" say the Wholesalers

NEWA Zone Meeting at Salt Lake takes inventory of conditions

IMPORTANCE of credit policies, inventory controls, handling overstocks, and building sales volume received the major attention in two major addresses and five panel discussions when more than one hundred electrical wholesalers and their manufacturer guests met in Salt Lake City, June 8-10, for their semi-annual convention.

J. Henry Wendt, Central Pacific district credit manager for Graybar Electric Co. Inc., told the group that electrical wholesaler operations are today on a level of lower margins which require better control of credit in order to make a profit. "In '49 and '50," he said, "more than ever we need an active, aggressive sales force in the field and a friendly, sales-minded, credit operation in the office and in the field.

"We may have to tighten up wisely," he continued, "because collections are slower, business failures are climbing, more accounts are overdue, bad checks and post-dated checks are cropping up more frequently. We are getting back to normal times but we dare not be panicky. We have passed from a sellers' to a buyers' market. We have heavy inventories on our hands and in our customers' investments which must be cleaned up. We are now in a period of readjustment, and credit men will and must decide whether or not this recession can be adjusted satisfactorily or turned into a depression or a serious panic."

Sound control of inventories is a necessity not only to the individual business firm, but it is also a necessity to the nation's economy as an aid in leveling out the economic boom-bust cycles, said Arthur I. Appleton, president of Appleton Electric Co., Chicago, in the other major address of the Pacific NEWA meeting. While inventory control has a general objective in gearing procurement to demand, it serves other purposes for the wholesaler, Appleton said. Sound inventory control improves the wholesaler's service to his customers, it permits better control of the wholesaler's inventory, it provides a more profitable control of the wholesaler's investment in goods. It serves the wholesaler by establishing and regulating the amount of stock, when to order, how much to order, and it provides for procurement follow-up.

Improving the Sales Organization

What wholesalers are doing to "stimulate better selling within their sales organizations" was the topic of the first panel discussion on the NEWA program. With E. E. Karsten, Gough Industries, Los Angeles, as moderator, the attending wholesalers reported on plans within their organizations. Karsten reported that his concern is planning boat and fishing trips in which each salesman will invite three or four customers as guests. Gough Industries also has put in new bonus plans to compensate salesmen for increased business and for bringing in new accounts. He told of another company which has put its sales manager into the field for all but two hours a day to work with the salesmen. Another wholesaler, Karsten reported, said he was improving his selling by "giving special service instead of special prices."

Harry Perl, State Electric Supply, Oakland, described his firm's sales building activities, emphasizing a "returning program" for the salesmen in which manufacturers' representatives are brought in to discuss not only their products but also the sale opportunities for these products. Another program at State Electric Supply, he said, is a Kardex system showing the development of each customer by the salesman. Both management and the salesman can watch the progress with each account, telling at a glance whether ground is being gained or whether they are slipping.

R. S. Belnap, manager of GESCO, Boise, described his branch training

program designed to help the customers make a profit. GESCO salesmen are trained in the fundamentals of operating an electrical contracting business, its cost and profit structure, so that they can work with their customers to help them make a bigger success of their businesses. The wholesalers received sage advice from an old-timer on the subject of building sales volume. Dave Harris, former vice-president of GESCO in charge of its Western region, and now retired, told the active wholesalers that in his opinion they shouldn't try to build more business by cutting down on the number of salesmen, or by cutting down on the salesmen's expense accounts. He said the wholesalers must develop a greater respect for the salesmen and realize that business is built out in the field by the salesmen not by the executives who grace the chairs in the main office.

Handling Overstocks

A second panel discussion brought to the forefront one of the most important problems facing the electrical supply wholesalers — the handling of overstocked items. Charles Goodwin Jr., GESCO, San Francisco, as moderator for the panel, said that the wholesalers had the choice of: (1) selling the item at a normal profit; (2) selling at a nominal profit; (3) selling at cost; (4) disposing at small loss; (5) disposing at a substantial loss; (6) try to return them to manufacturers; (7) give them away or scrap them. Charles Matthews, WESCO, San Francisco, suggested more use of sales bonuses for salesmen to help move overstocked items, and pointed to the possibility of interchanging such items between branches of chain houses. Ross Hartley, Los Angeles, reported on the experiences in that city of using a neutral agency to interchange overstocked and unwanted items between independent wholesalers, saying that the idea was beset by problems of brand, but that it failed mostly because of personal jealousies.

W. M. Jewell, WESCO, Seattle, chairman of the Pacific Zone of NEWA, was in charge of the convention. The convention committee included E. E. Brazier, chairman, and S. B. Cooper, S. Y. Lakin, John Longden and William Berriman. The program was arranged by S. S. Brundage, chairman; John Longden, vice-chairman; John E. Kitchen and L. E. Starkweather. Pacific Zone secretary, R. A. Balzari, coordinated the convention activities.

Denver Distributor Stages His Own Home Show

Celebrating its 40th anniversary, Auto Equipment Co. of Denver staged a home show of its own both for its dealers and then opened the show to the general public on its last day. The large ballroom of the Shirley Savoy Hotel was used for the show. Separate exhibits were set up for the various lines carried by Auto Equipment Co. Representatives from factories attended and participated in the showings. Dealers from the states of Colorado and Wyoming were invited to come to the showing. Salesmen were given a preliminary briefing at a dinner the night preceding the opening of the show by Ed Huff, sales manager, who had spearheaded the plans for the show. The 15 household appliance department salesmen also served in the booths.

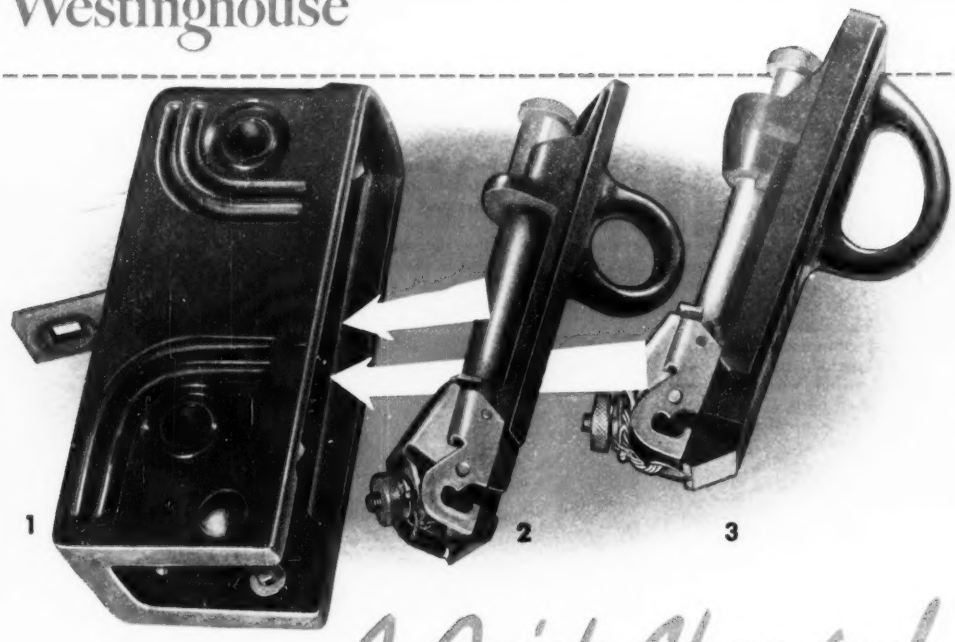
Lines displayed were Norge ranges and refrigerators, Youngstown kitchens, Emerson radios, Sunbeam appliances, Simplex ironers and washers, Arvin fans and heaters, Knapp-Monarch table appliances, Eureka vacuum cleaners, New Home sewing machines, Presto pressure cookers, and Pabco flooring. Some of the factory men participating included Joseph Groshams, general sales manager, Simplex division, Barlow Selig Mfg. Co. of Algonquin, Ill.; Max Hoover, representing Norge; Bob Bower, Emerson radios; Ray Huckins, Knapp-Monarch, and Albert Solen, Sunbeam representative.

Started originally as an auto equipment company in 1909 by Stuart T. McCollum, in 1924 the Norge line was taken on as well as Atwater Kent, and in 1939 Youngstown kitchens. Present officers are Robert McCollum, president; I. H. Parks, vice-president; W. H. Rogers vice-president, and A. R. Wilson, secretary-treasurer. It was announced that Ed Huff was leaving the company to become a manufacturer's representative, and that W. S. "Bing" Law, former general sales manager of Norge, would replace him as sales manager.

Auto Equipment Co., Denver distributor, put on its own home show recently with exhibits of all the lines it handles. At the Sunbeam booth Ed Huff, standing, advises Bob Bower and Ray Huckins on shaving. At right, the Norge exhibit. Dealers from Colorado and Wyoming attended. Show was opened on the last day to the general public

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



A Quick Changer!

...for fast re-fusing..for future expansion

Interchangeability keynotes Westinghouse porcelain-enclosed cutouts. Only Westinghouse gives you this versatility in line protection. Consider what this means:

First, fuse replacements are fast . . . safe . . . easy. Lineman removes door with hookstick—replaces it with a fused door. Fuse links can be replaced at the truck or in the shop.

Second, as line capacity outgrows the cutout interrupting rating, the EA cutout door may be replaced with the new Type HC (high interrupting capacity) door—either dropout or non-dropout type. That's because *any* door will fit *any* housing.

In addition, you get greater safety; complete hookstick operation; 180° dropout for clear indication of blown fuse; cool operation; light weight combined with great mechanical and electrical strength.

These cutouts are available now in a range of sizes to meet your requirements. See the versatility of this cutout. Ask your nearby Westinghouse representative or distributor for a personal demonstration and Booklets B-3833 and B-4299. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-60705

1. PRESTITE PORCELAIN HOUSING—50-ampere, 5-kv, identical for both Type EA and Type HC cutouts.

2. MOLDARTA TYPE EA DOOR—1,200-ampere interrupting capacity.

3. MOLDARTA TYPE HC DOOR—Interchangeable with Type EA cutout door. Interrupting capacity 8,000 amperes at 2,500 volts, 5,000 amperes at 5,000 volts.

Westinghouse

FUSE CUTOUTS

FOR ANY SYSTEM

Understand the Home to Sell It

THAT home economists are playing an increasingly active role in the appliance business, not only with utilities, but in other phases of the industry was evidenced when some 3,000 home economists met in San Francisco from June 28 to July 1 for the 40th annual convention of the American Home Economics Assn.

Choosing the theme "Advancing the Frontiers of Home Economics," in recognition of the California Centennial Gold Rush, their program was developed through general sessions open to the public, professional parallel meetings going on continuously throughout the four-day period, and exhibits at the Civic Auditorium, where 160 manufacturers from all parts of the country displayed products applicable to the home economics fields.

Preceding the convention the Home Economists in Business met for a two-day conference with the principal meeting devoted to "How Mrs. America Cooks and Keeps House," presided over by Mrs. Ruth Conrad Norbury, chairman of local arrangements. The type of household equipment used by housewives in northern California was discussed by Miss Marguerite Fenner, director of home economics, Pacific Gas and Electric Co., who based her figures on a survey conducted by her department during April of this year. Personal interviews with housewives revealed that:

48% cook oven meals.
57% use their broilers.
40% make frozen desserts in refrigerators.

On the question of how long housewives had owned their ranges:

36.5% less than 3 years.
17.2% 4 to 7 years.
22.8% 8 to 11 years.
23.5% more than 12 years.

53.3% of the women own electric mixers, of which 65.5% are late models.

Of those interviewed 87.7% do home baking of cakes, while 92.3% bake pies. If the housewife is to be satisfied with the equipment and materials she uses, she must employ the correct utensils, Miss Fenner emphasized.

She pointed out the interdependence of utility, appliance manufacturer, dealer, utensil manufacturer and food product company. The result Mrs. America achieves when she uses the recipe, utensil, range and cooking fuel determines her satisfaction and her future value as a customer to all concerned.

Miss Gladys Price of Southern California Gas Co. reported that dissatisfied customers are generally caused by poor recipes, poor measuring and mixing on the part of the user, wrong utensils, and the fact that "my husband bought the range anyway — it wasn't what I wanted."

Miss Laura Jim Alkire, General Electric Co., urged that more emphasis be placed on the care and cleaning of utensils, their better storage and their replacement when they deteriorate after use. Home economists in their contacts with the housewife should stress the proper choice of utensils as related to the size of oven and their use, said Miss Selma Andrews, director of Hotpoint Institute, Chicago.

Mrs. Elizabeth Sweeney Herbert, household equipment editor of *McCall's* Magazine, advocated that home economists take a greater part in determining the design of kitchen equipment materials, now too frequently decided by the manufacturing engineers alone. Housewives should be introduced to better homemaking techniques, even if they are beyond her income, she declared.

Home economists representing electrical manufacturers and distributors attended the two-day session of the Home Economists is Business, held in advance of the national convention of the American Home Economics Assn. in San Francisco. Shown here are, left to right: Lura Jim Alkire, General Electric, Bridgeport; Dorothy M. Sherrill, home economist, Graybar, Seattle; Selma M. Andrews, manager of the Hotpoint Institute, Chicago; Marguerite Reinhart, Pacific district home economist for Hotpoint at San Francisco, and Patricia J. Murtaugh, home economist for the Graybar Electric Co. at San Francisco

Reports on how Mrs. America cooks and keeps house were presented at the principal meeting of the Home Economists in Business, attended by such representatives as, left to right: Margaret DeAtley, Crosley Division, Avco Mfg. Co., Cincinnati; Margaret D. Doreghty, director of the Bendix Home Laundry Institute, South Bend, Ind.; Erma Meeks, Hawaiian Electric Co., Honolulu; Cleo Filsinger, San Francisco Sales Division, Pacific Gas and Electric Co.

You're sure it's the

RIGHT LIGHT

...if it's "via Graybar"!

That's true whether the light is for street or highway – plant or yard – play area, manufacturing plant, store, office, home . . . or product. For Graybar has the biggest selection of lamps and lighting units available anywhere. And Graybar – working with utilities, electrical contractors, and operators of industrial, commercial, and institutional establishments – has studied, planned, and supplied lighting systems of every type. Thus a Graybar Lighting Specialist can be of great assistance to you or your customers in the planning of any lighting – indoors or out. He can recommend impartially the best equipment for any illumination need.

Local Stocks of Lamps

Graybar distributes all types and sizes of G-E lamps -- fluorescent, filament, mercury – clear, frosted, colored – glow lamps, heat lamps, germicidal lamps, flashlight lamps. Stocks are maintained at Graybar's more than 100 warehouses throughout the nation for prompt delivery anywhere.

EVERYTHING FOR LIGHTING

In addition to the fixtures and lamps, Graybar can provide all the proper wire, conduit, switches, and ballasts. All are first-quality products of leading manufacturers.

Send coupon for free book

You get the best of everything electrical Via GraybaR

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GRAYBAR ELECTRIC CO., INC.
420 Lexington Ave.
New York 17, N. Y.

Please send me free a copy of your 84-page book, "Planned Commercial Lighting".

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

"Although it is often impossible for the housewife to remodel her kitchen, the home economist can help her arrange for better storage and methods within her means," Mrs. Clara Gebhard Snyder of the Wheat Flour Institute of Chicago pointed out. It is the function of the home economist to "create the will" which will lead to future action.

Miss Erma Meeks, director of home service for The Hawaiian Electric Co., told of her department's activities in reaching housewives of different nationalities through classes, club talks, newspaper articles and an extensive recipe service. She reported that the kitchen planning service of her department was responsible for the installation of 60 model kitchens in 1948 and 40 more during the first six months of 1949.

Problems of household equipment in the different professions of home economics were brought out at one of the parallel sessions during the convention. In the form of a panel discussion Dr. Martha Johnson of General Electric Co. stressed the importance of testing appliances before they appear on the market. In describing the testing laboratory operated by her company, she said that the home economists work in close cooperation with company engineers, preparing reports on all new electrical appliances as they are made.

"We point out the bad as well as the good features, offering suggestions based on what the American woman wants in her home. We try to use the appliances as the average woman would put them to use in her home. Results of investigations made in the laboratory eventually come out in instructions to the consumer, through the Consumer's Institute."

Home service girls are still few in number but large in influence, was the opinion of Mrs. Jessie McQueen of the American Gas Assn., New York. Through home calls made by the home economist, the utility has a sounding board to explain household equipment. It gives the home economist an opportunity to take the proper explanation to the place where it is needed, and there are all kinds of women who need help in using household equipment, she said. It's also an ideal way to promote more cooking at home.

Another excellent way to show customers the proper use of equipment is through lectures and demonstrations. They also serve to bring people to the utility.

She cited well-planned kitchen installations for home service departments, with bright colors and practical arrangements in kitchen planning, as another effective way to promote the value of modern household equipment.

Home service girls working in cooperation with schools can provide valuable instruction to teachers and classrooms, as well as aiding in getting new equipment into schools. New home economics departments will not only attract new girls, Mrs. McQueen said, but will make them interested in seeking home economics as a profession.

Out Nearer to the Customers

With modern design and coloring in its handsome interior decoration, the new headquarters of Sues, Young & Brown Inc. was opened June 5 at 3636 S. Bronson Ave., Los Angeles 16, after a preliminary open house to customers and friends on June 2. Open house week was held June 5-11 during which demonstrations of all the products handled and the facilities of the new plant were given to those who attended.

The new facilities for receiving, shipping and service, as well as display and offices, cover 40,000 sq. ft. of ground. It is located in the rapidly growing Crenshaw district, has ample parking space which may later be used for expansion if wanted, and has a trackage direct to the side door. All the warehousing is consolidated under one roof and the whole plant is equipped with a sprinkler system.

Exceptionally attractive is the large display area at the front of the building along one side of which are located the business offices. On the other side of the display space is an ample auditorium, which will seat 100 people, and a sound-proofed radio and television demonstration room. The record department is also along that wall with convenient arrangement of counter and stock for quick service to customers.

Lines handled by the firm are displayed attractively on the floor in setups which are recommended to dealers for similar displays in their stores. Lines carried are Coolerator refrigerators, freezers and ranges, Hamilton clothes dryers, Speed Queen washers, Zenith radios and television, Lewyt vacuum cleaners, Vornado fans, Regina vacuum cleaners, Proctor table appliances, MGM and London records, Seth-Thomas and Westclox, Dormeyer and Kitchenaid mixers and Cory coffeemakers. The firm also handles Thermador built-in ranges and water heaters.

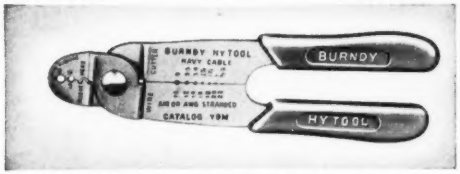
Private offices of M. G. Sues, president, and Ed Young, secretary-treasurer, are at the rear of the display floor. Since the firm started business in 1944 it has had headquarters at 1509 S. Figueroa St., Los Angeles.

Ed Young and "Pete" Sues, seated, in the latter's office in the new Sues, Young & Brown headquarters; Marshall Wells, sales manager, standing. At right, a view down the large appliance display and general company offices

Tools that replace the Torch...

Burndy Hydraulic Hypress—Y34-A. Hand-operated—weight 9 lbs.; 18,000 lbs. pressure; for conductors No. 6 through 500 Mcm. Used to install Hylugs, Hylinks, Hytaps and overhead Hysplices.

BURNDY Hytools and Hypresses



Burndy All-Purpose Hytool—Y9M. Hand plier with wire cutter and stripper. For conductors No. 22 through No. 10.

Burndy Hytool MY29. Hand-operated—for conductors No. 8 through 4/0 without change of dies.

Burndy Hydraulic Hypress—Y34-B. Foot-operated type; 18,000 lbs. pressure; for conductors No. 6 through 500 Mcm.

WHY fuss with solder when making electrical connections? Efficient, rapidly operated Burndy HYTOOLS and HYPRESSES indent one-piece, pure copper HYDENT connectors onto all conductors from #22 through 2000 Mcm.

With this modern HYDENT connecting method you assure uniform depth of indent, and *strong, efficient electrical connections, every time.* But more, you make substantial savings on *every* connection. You just insert the conductor into the connector barrel, and indent with the HYTOOL. *Nothing simpler . . . nothing quicker . . . nothing surer!*

No matter what your requirement, Burndy has the right tool for your connecting needs . . . hand, portable or bench types; manual, hydraulic or pneumatic operation. Get all the facts. Send for Burndy HYDENT Catalog Y46 today.

Hylugs—Hylinks—Hysplices are a few of the many Hydent connectors.

Connect with
BURNDY

New York 54, N. Y.
WESTERN BRANCH: Vernon 11, California

Northwest Association Starts New Year

Thrailkill Walters Setterstrom

Following enthusiastic reports of section and committee chairmen at the 42nd Annual Meeting of the Northwest Electric Light & Power Assn. in Vancouver, B. C., June 22, Howard N. Walters, B. C. Electric Railway Co., was elected president of the association for the year commencing July 1. He succeeds W. L. Thrailkill, Washington Water Power Co., who held the position during the past year and whose administration was generally acclaimed to have been most successful. Walters acted as vice-president during the past year.

Roy H. Ashworth, Utah Power & Light Co., was elected vice-president.

Vice-presidents for each state and province in the association's territory were elected as follows: British Columbia, Tom Ingledow, B. C. Electric Railway Co.; Idaho, Ralph E. Gale, Idaho Power Co.; Montana, R. C. Setterstrom, Montana Power Co.; Oregon, Frank M. Warren Jr., Portland General Electric Co.; Utah, Adam S. Bennion, Utah Power & Light Co.; Washington, L. E. Karrer, Puget Sound Power & Light Co. Elmer E. Kime, California-Pacific Utilities Co., Baker, Ore., was elected a member-at-large on the executive committee, the other utility member being John Dierdorff, Pacific Power & Light Co., whose term carries over.

Elected members and alternates on the executive committee representing manufacturers, wholesalers, contractors and dealers were: C. A. Morrison, Canadian General Electric Co., Vancouver; W. F. Smith, Line Material Co., Spokane; W. P. Gullander, General Electric Supply Corp., Seattle; Tom Clarke, Northern Electric Co., Vancouver; E. B. DeFeyter, Power City Electric Co., Spokane; Carl Bressie, Bressie Electric Co., Portland; George Rankin, Yakima Hardware Co., Yakima; Ray L. Gray, Eastern Oregon Electric Co., LaGrande, Ore.

As has been customary in the past, a number of industry pioneers in the Northwest territory who have recently been retired from active service were elected to honorary life membership. The group so honored at the 42nd Annual Meeting is as follows: From Pacific Power & Light Co.: H. H. Schoolfield, J. H. Siegfried, Sherman B. Clark, Tom Perry; from Montana Power Co.: M. E. Buck, H. H. Cochran, A. C. Pratt, J. R. Thomas; from B. C. Electric Railway Co.: Asgar Vilstrup, Stanley A. Horner, E. N. Horsey; William F. Hamilton, Portland General Electric Co.; C. A. Wolfrom, Utah Power & Light Co.; H. McCullough, Tobacco River Power Co., and Alexander S. Moody, General Electric Co. This list includes engineers, operating superintendents, accountants, division managers and a manufacturer, who entered the industry circa 1910, and who spent most of their time in it in the Northwest.

Plans for the association's new year will be laid by the new executive committee later in the summer.

Personnel Conference

Employee training and accident prevention and safety were the dominating subjects at the annual conference of the Personnel Section, Northwest Electric Light & Power Assn., in Seattle, May 24-27. One day was given to each of these subjects and the third day took up miscellaneous topics in the field of personnel management. The program of the meeting was developed by L. T. Matter, Puget Sound Power & Light Co., section chairman.

A feature of the meeting was a visit to the Washington State Rehabilitation Center, Seattle, where seriously injured industrial workers are rehabilitated for their jobs by special treatment. This visit was conducted by Henry Redke, executive director of the center, which is maintained under the state industrial compensation system.

W. L. Thrailkill, Washington Water Power Co., president of the association, opened the meeting with general remarks on trends in the industry in the Northwest. The personnel people have a big problem, he said, in handling the 13,000 utility employees in the territory to strengthen this group as a bulwark against the ideology of government operation. He particularly advocated working in closer relationship with young people in the community through Boy Scout activities and other civic affairs for youth; and the counseling of students about their occupations to secure good recruits for entry into the private utility business. The tide his turned, he said, and every day we are making more friends for private enterprise.

In a luncheon talk, L. E. Karrer, executive vice-president, Puget Sound Power & Light Co., discussed the power outlook in the Northwest, outlining the joint army engineers and reclamation Plan 308. He pointed out that the effective use of government generating plants on the Columbia depends upon control of the seasonal flow of the river through upstream dams. He stated there would be a deficiency in both peak and energy the next few years. He showed by charts how a serious situation was averted during the past winter by voluntary curtailment of peak, and indicated that a similar curtailment would be necessary during the coming year, with a possible curtailment of kilowatt-hour use also.

In the first day's session on accident prevention and safety, presided over by Claude C. Haggard, California Oregon Power Co., chairman of Accident Prevention Committee, three main subjects were taken up. J. T. Bradshaw, Puget Sound Power & Light Co., led a discussion on accident investigation, in which the methods applied in the different companies were explored. Most of the companies represented engaged in some form of investigation of the more serious accidents by an impartial committee, in which the emphasis was on how similar accidents

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till the right fuse blows

a new concept in recloser operation!

G-E invites you to consider a different concept, the alternate operating function built into the FR-1 Recloser. Suppose a recloser, after its two instantaneous openings, HOLDS CLOSED *but only until the right fuse blows*—then automatically resets for instantaneous openings—ready to again clear temporary faults. What then?

FIRST— Fewer reclosers would be needed for complete protection. Where reclosers would ordinarily be required, you could use co-ordinating fuses instead.

SECOND— Fewer consumers would be affected by permanent faults, because the "hold-closed" function lets you use more co-ordinating fuses. You can break up a feeder into five, six or even more sections, each protected by a progressively smaller fuse. When the recloser holds-closed, it *forces* the *right fuse* to clear a permanent fault, thus confining outages to smaller areas.

THIRD— You can pick up the load after an outage without by-passing the recloser. No need to worry about inrush and motor starting currents because the recloser can't lock open—it holds closed, picks up the load, then automatically resets to normal position.

General Electric believes that on rural lines, this "hold-closed" function is the answer to lower cost protection, fewer outages per consumer and faster service restoration. Therefore, its new recloser, the FR-1, has been designed to embody this exclusive "hold-closed" function. Conversion from conventional operating function to "hold-closed" function can be made in the field. With this "hold-closed" function, the recloser opens twice instantaneously, each opening followed by a 1-second reclosing. This clears non-persistent fault without damage to fuses. If the fault is persistent, the recloser then *holds closed*—but only long enough for the fuse to blow and clear the fault—whereupon the recloser quickly resets, ready to go again.

The FR-1 recloser can also be used with the conventional operating function—two instantaneous openings, plus two time-delay openings, to lock open. Because the time-delay openings are controlled by a highly accurate mechanical-escapement timer, operating in air, the FR-1 is not affected by temperature or condition of oil—thus permitting *reliable* year-round co-ordination with more ratings of fuses than any other conventional lock-open type of recloser. Because the FR-1 resets 5 times faster it gives *more* protection.

For the full story on the new "hold-closed" function, including complete application information, write for Bulletin GER-131. *Apparatus Department, General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

could be prevented in the future. There was disagreement as to whether penalties for causing accidents should be applied, though several companies felt that such penalties were effective.

The effect of distribution line specifications on safety were discussed under the leadership of F. H. Ferguson, Puget Sound Power & Light Co., who urged that safety men be consulted when writing specifications so that safety would be built into the design. He also advocated specifying methods of doing certain classes of work on handling certain kinds of machinery. All agreed that standards should be prepared with a view to safety, and that union cooperation in the preparation of these standards is desirable.

Closely related to the subject of standards was a discussion of safety rules and safe working practices, led by Roland R. Blantz, Portland General Electric Co. This discussion brought out that such rules must be stressed continually among the men, and many companies do this by making them the subject of discussion in company safety meetings. There should be follow up in the enforcement of these rules and again union cooperation is essential. In some unions infractions of the rules are penalized by the unions.

The second day's discussions of the various aspects of training was conducted by A. R. Leavitt, California Oregon Power Co., vice-chairman of the section. The subject of indoctrination of new employees was handled by Russell James, Portland General Electric Co., who said that indoctrination programs were designed to secure the highest level of quality and quantity of production at a minimum of cost, time, effort and friction. Discussion revealed that all the companies had indoctrination programs of varying elaborateness. Consensus was that, where possible, new employees should go through the personnel department where they should get information about their jobs and about company policies before being turned over to the supervisor. Hand books or manuals of information and regulations were in use by most companies. It is a good thing to inform new employees of the benefits they receive outside their salaries, such as pension plans, sick leave provisions, hospitalization, and similar matters in the indoctrination period. In companies having widely scattered territories, it is impossible to put employees from the outlying divisions through the central personnel office, and a check list covering the indoctrination interview is issued for the division offices so that the interview may be performed locally.

Job training, outlined by Ralph Kluckner, B. C. Electric Railway Co., is the key to efficiency in the organization. Every employee should understand the importance of his job, he said, and how it fits in with the company operations.

Reports from the companies on this subject explained apprenticeship training and other programs employed for job training. Training of plant and station operators in remote points presented one of the more complicated problems. Portland General Electric Co. emphasizes training of meter readers with a view to stepping them up to more responsible work, with emphasis on public relations. Puget Sound Power & Light Co. has student engineers from nearby universities who are put through many departments of the company in anticipation of their developing into supervisors or executives.

The two essentials for a successful program of education and training of supervisors are that there must be a demand for this training from the supervisors and there must be top management participation, said J. W. A. Fleury, B. C. Electric Railway Co., in opening this subject. In contemplation of putting in supervisory training in the company, Fleury stated that an attitude survey was taken among the supervisors through a questionnaire that was designed to put the supervisors on the spot, to indicate that they were not as good as they thought they were. The program will start at the top with the executive vice-president conducting conferences with department heads and working on down from there to potential leaders or supervisors.

Roy H. Elfstrom, B. C. Electric Railway Co., discussing the relation of training to safety, emphasized that safety should be built into the company training program all along the line. There was agreement that written safety working rules should be kept before the men in some form or other, but there was difference of opinion as to whether these rules could be written into production manuals or whether they should be taught as a separate study. There was likewise agreement that the foreman was the key man in safe working practices but doubt was expressed that the average foreman was a good teacher, and perhaps the teaching of safety is a job for a specialist.

Patrick Johnson, vice-president of Puget Sound Power & Light Co., in a luncheon talk explained the cooperative plan of education effective in some engineering institutions in the country. Under this plan a student works half his time in industry and spends the other half of his time at college, alternating back and forth in three-month periods. Through this plan the student needing financial aid beyond his family resources can put himself through college, and industry gains by getting better oriented and more experienced recruits, since graduates will have had opportunity to find their particular interests and aptitudes through the work they have done during their college courses.

Toward the end of the session, the conference went into a discussion of miscellaneous personnel subjects. With reference to operating under the fair employment practice acts recently passed by the Northwest states, it was brought out that the company should develop standard qualifications for selection and keep adequate records, and then accept every one who can get through this screening.

Practices with respect to protesting claims for unemployment compensation were surveyed in connection with the collateral subject of termination interviews. It was shown that termination interviews could throw a good deal of light on the quality of leadership of the supervisors.

In a company with a large percentage of old-time employees, the key to keeping up the quality of the organization is developing better supervisors. When a man takes a supervisory job, he embarks on an entirely new set of duties. He must not only know his job but he must direct work and must know the relation of his department to the other departments of the company up and down. He becomes a part of management.

Methods of keeping employees informed through house organs, letters from management and other means were discussed and the importance of this activity was emphasized.

At the third dinner meeting, Burton Wright, assistant professor of naval science, University of Washington, discussed industrial psychology and what it can do for industry, pointing out that application of psychology in selection and management of employees gives the company at least a "house percentage" in employee effectiveness.

Leonard Stirn, Washington Water Power Co., was selected as vice-chairman of the section for the next year, and Fons Hughes, safety supervisor of Pacific Power & Light Co., was appointed vice-chairman of the accident prevention and safety committee.

Contractors

Credits were discussed at the July meeting of the Electrical Contractors Assn. of Los Angeles by Vice-President Edwards of Hollywood Wholesale Electric Co. Next meetings were scheduled for Aug. 1 and Sept. 6 at 4806 Santa Monica Blvd. Estimating classes are also being conducted by the association, an independent one.

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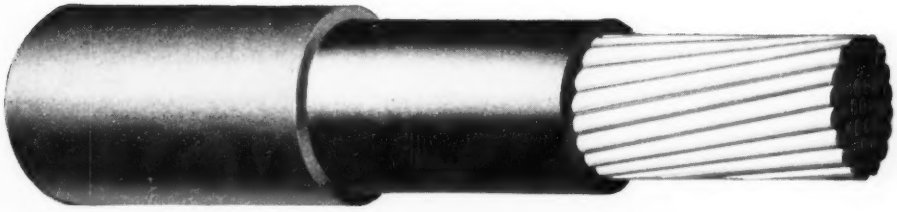

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PANORAMA OF THE PCEA

Edited by A. X. Schilling

Electrical Living Institute

THE Electrical Living Institute sponsored by PCEA's home economics committee, and authorized for full Institute credit by the Los Angeles County Board of Education, will hold the first of its five meetings on Oct. 13. All five sessions will be conducted in Southern California Edison Co.'s Electrical Living Center in its Alhambra commercial office. Teachers will be allowed one unit of credit for each session they attend.

The first meeting, on Oct. 13, will feature electricity and food preparation, refrigerators and home freezers, under the chairmanship of Maurice Stokesbarry, deputy superintendent of schools, Alhambra School Department. Speakers will be Marjorie Harper, General Electric Co., San Francisco, and Lois Cline, Frigidaire Sales Corp., Los Angeles.

The second session is scheduled for Oct. 20, with Dr. Reuben R. Palm, director, Division of Secondary Education, Los Angeles County School Department, acting as chairman. Topics will include ranges, water heaters, dishwashers and table appliances, and speakers will be Marguerite Fenner, PG and E, San Francisco; Howard Oliphant, General Electric Co., San Francisco, and Lois Ferris, Westinghouse Electric Corp., San Francisco.

The third session, on Oct. 27, will be devoted to electricity and home laundering, washers, driers, ironers, and hand irons. Speakers will include L. D. Stull, Apex Rotarex Corp., San Francisco; Frances Alexander, Leo J. Meyberg Co., Los Angeles; Dorothy Huse, Proctor Electric Co., Los Angeles, and Elizabeth Hull, Gordon E. Wilkins-Ironers Inc., Los Angeles. Chairman of the session will be Mrs. Marion E. Jones, home economics instructor, South Pasadena School Department.

The fourth session will be held on Nov. 3, under the chairmanship of Mrs. Ferne Hood, coordinator of health education, Los Angeles County School System, and will be devoted to discussions on home lighting: its relation to eye conservation. Speakers will be J. Walter Howard, General Electric Co. Lamp Department, Los Angeles, and R. A. Buckby, Westinghouse Electric Corp. Lamp Department, Los Angeles.

The final session, on Dec. 1, will be under the chairmanship of H. C. Rice, Southern California Edison Co., chairman of PCEA's Electrical Living committee. The meeting will include discussions on kitchen planning and basic principles of kitchen planning as related to good home management procedures. Speakers will be Claire Helwege and Lloyd Bowles, both of Southern California Edison Co.

Committee Chairmen

Here are the new committee chairmen, as recently appointed by President I. W. Borda: Administrative Services Section—chairman, L. W. Brillhart, PG and E, San Francisco; vice-chairman, E. J. Wright, San Diego Gas & Electric Co. Business Development Section—chairman, George N. Hawley, Southern California Edison Co.; vice-chairman, R. I. Mendes, PG and E, San Francisco. Operating Economics Section—chairman, Frank D. Beardsley, Coast Counties Gas & Electric Co., Santa Cruz; vice-chairman, A. A. Straub, Southern California Edison Co.

These men have been appointed as chairmen of the committees indicated: George C. Tenney, McGraw-Hill Publishing Co., San Francisco, resolutions; R. N. Dreiman, Coast Counties Gas & Electric Co., San Francisco, budget; R. W. Jackson, General Electric Co., San Francisco, publicity; E. H. Galchutt, Graybar Electric Co., Los Angeles, membership; Harry A. Lee, PG and E, San Francisco, vice-chairman, membership; K. M. Ryals, Ryals Electric Co., San Francisco, code and ordinance; G. F. Maughmer, General Electric Co., Los Angeles, vice-chairman, code and ordinance.

J. H. Adams, Southern California Edison Co., adequate wiring; Marjorie Harper, General Electric Co., San Francisco, home economics; J. W. Howard, General Electric Co. Lamp Department, Los Angeles, home lighting; K. L. Hampton, Valley Electrical Supply Co., Fresno, kitchen and laundry; J. Clark Chamberlain, Bureau of Radio and Electrical Appliances, San Diego, television; F. M. Raymond, San Diego Gas & Electric Co., advertising; T. W. Christensen, PG and E, San Francisco, Agricultural Power Handbook; Lyle B. Jones, San Diego Gas & Electric Co., liquified petroleum gas; John S. Walsh, PG and E, San Francisco, commercial and industrial lighting.

P. H. Adams, San Diego Gas & Electric Co., communications; H. C. Rice, Southern California Edison Co., Electrical Living; C. C. Blecksmith, Duncan Electric Co., Los Angeles, meter; E. C. Hunt, PG and E, San Francisco, safety; George M. Rankin, Southern California Edison Co., highway lighting technical subcommittee.

Names of members of the various committees will be announced here later.

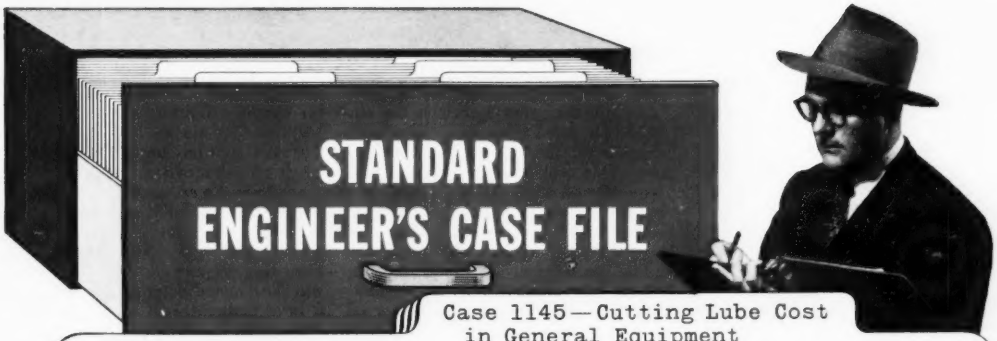
Conference Dates

Dates for the next conference and the annual convention of PCEA both have been decided upon by the board of directors. The fall conference will be held at Fresno, Nov. 17-18. The annual convention will be held right after Memorial Day, at Reno, Nev., May 31 to June 2, 1950.

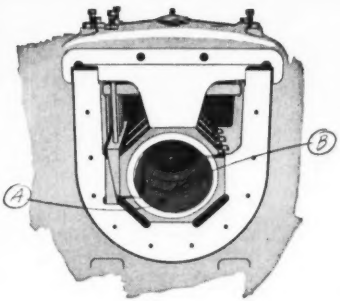
The section guidance committees will meet in Los Angeles on Aug. 31 to formulate plans for the Fresno conference. The board of directors will meet the following day to consider the plans proposed by the guidance committees.

IES

George Smedberg, Associated Lighting Service, San Francisco, and Raymond H. Rhoades, research director of McClatchy newspapers and Broadcasting Co., discussed theater lighting at a recent meeting of Mother Lode Chapter IES, Sacramento. Rhoades, a graduate of Stanford in stage production, is technical director for Sacramento Civic Repertory Theater and has taught stage lighting. Smedberg, designer of specialized lighting equipment for stage work and himself an authority on stage lighting, illustrated how special lighting effects are handled.



Case 1145—Cutting Lube Cost in General Equipment



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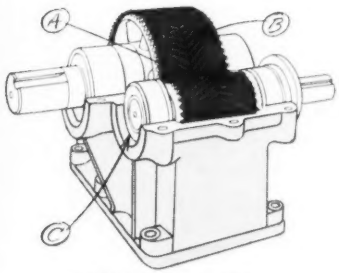

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Code Changes Minor

The quietest and quickest National Electrical Code meeting ever held took place recently in San Francisco at the fifty-third annual meeting of the National Fire Protection Assn. Under the new procedure which eliminates the large meeting with 50 representatives and 50 alternates and considerable debate, the new process had cleared most of the debate in panel sessions of individual article committees and only the final sifted-down changes were submitted for approval or rejection. The meeting started under Chairman Alvah Small in the morning and continued through the noon hour to finish before 2 p.m. The small correlating committee which digests and reedits the code met afterward, and the whole thing was done in one day.

Very few changes were proposed, however. Most of the changes were editorial or minor. Possibly more significant is what was not done than what was actually approved.

Perhaps the most important change, at least for the West, was made in sections 4326 and 4327. There was added: "In the case of distribution systems supplying wye-delta or delta-wye connected transformers (having wye neutral point in the primary underground or not connected to the circuit) the authority enforcing this code may require that three running overcurrent units be provided for the protection of 3-phase 3-wire motors, if field experience in the territory of the authority indicates that a third unit is desirable because of motor winding failures at times of primary single-phase failures, unless the motors are otherwise adequately protected."

This change has long been asked by California utilities because of numerous pump motor damage cases and some cases of unwinding of a pump runner in a deep-well pump caused by weight of water column when a primary single-phasing fault occurred.

Other items in the approved changes require identification of conductors connected to the neutral of a 4-wire delta secondary; permitting armored cable be run in air voids of concrete masonry blocks or tile walls where not exposed to moisture; permitting 1/3 hp. motors be connected by plug to a receptacle or outlet; clarifying the running of multiple low-voltage control wires in the same raceway with lighting or power circuits; requiring grounding and separation of antenna (for television) and permitting bonding for grounding and lightning rod systems; adding aluminum alloy to the metals from which antenna may be made.

However, a subject of importance in the West, namely, radiant heating, will not be included in the new code. Sufficient data have not yet been accumulated to pass upon the suggested rules for this type of installation, leaving the matter pretty much in the air.

The rejected proposals were also discussed at the meeting, the most important of which was the type-S fuse requirement. This had been requested by nearly all inspector groups, but action was deferred pending study of a new report by the light and power group on branch circuit protection, which is promised to give considerable new data on this controversial subject. More details of the changes in the code will be released later.

IAEI

Wiring a hospital is like working for too many bosses, each giving differing orders. For in California safety provisions come under many jurisdictions and some do not know a wire from a hot rock. The administrative code puts electrical provisions under the state fire marshal. The latter leans on the Electrical Safety Orders, but the safety orders are limited to protection of employees, not patients. So the engineer, the contractor, the electrician and the electrical inspector are all confused by a lack of coordination and an inadequacy of electrical requirements for hospitals and also for other places of public assembly.

A committee headed by B. F. Wiesinger, San Francisco inspector, reported this conflict to the Northern California Chapter, International Association of Electrical Inspectors, at its July 16 meeting in Berkeley, presided over by Walter Keller, Santa Cruz electrical superintendent. The committee recommended that a separate section on emergency lighting and hospital electrical requirements be added to the Safety Orders and that the matter be put on the section meeting program in October. Next meeting, in Marin County, Sept. 17, is to hear from a panel of people representing various interests in the problem. James Ambrosi, Oakland, will assemble such a panel.

Besides a full program of inspectors questions answered by a panel, Howard Dodge, Underwriters' Laboratories Inc., gave a revealing talk in answer to the question, "Is the Listed Device Used as Intended?" Mere presence of an UL label is not enough, he showed by numerous instances. Reference should be made to the "green book," the electrical equipment list of the Laboratories, to check just how and for what each device listed should be used. Most trouble comes from misuse of a device which is perfectly safe for another use.

For temporary power service on construction jobs, the committee appointed by the Southern California Chapter IAEI favored 4"x6"x20' poles rather than the 6"x6"x20' compromised upon for northern California by the Public Utilities Commission and the utilities. The 4x6 pole has been a standard in much of southern California for some time. F. E. Emerson, engineer for the commission, urged standardization on the 6x6 as the safest for climbing, explaining the legal aspects of deviation from G.O. 91 any further. The matter was recommended for further study by a joint committee of all utilities and inspectors.

This occurred at the last meeting of the chapter at Long Beach. It was held on the day of the funeral of a former active member, one who had established the May meeting each year in Long Beach, Otis Newcomb, past president of the section and former chief electrical inspector of Long Beach, who had been an invalid for some years. Early noon adjournment permitted many to attend the funeral.

O. G. Wedekind, engineer, Underwriters' Laboratories Inc., San Francisco, repeated the talk he had given at Santa Cruz on the hazards checked in passing on television receivers. George Tansey, chief, electrical division, Los Angeles, chairman of the chapter, presided. Distinguished guests included Charles L. Smith, IAEI secretary-treasurer, Chicago; W. R. Volheye, Portland, and W. L. Gaffney, Tacoma, both past presidents of IAEI.

EMA

Among the subjects to be presented at the 5th annual Pacific Electronics Exhibit in San Francisco, Aug. 30-Sept. 1 will be a discussion of subminiature radio tubes and circuits by Dr. Cledo Brunetti of Stanford Research Institute, a report on radio circuits for telephone and television by D. I. Cone of Pacific Telephone & Telegraph Co., and a discussion of cyclotron circuits by W. Ross Aiken and Dick A. Mack of the University of California Radiation Laboratory. The convention is being sponsored by the West Coast Electronics Manufacturer's Assn. and held in conjunction with the annual Western Regional Convention of the Institute of Radio Engineers.

Electric Clubs

Joseph A. Long of Southern California Edison Co. is the new president of the Electric Club of Los Angeles, succeeding Randolph Karr. Other new officers are: A. H. Howard, first vice-president; J. F. Maughmer, second vice-president; Ivan L. Bateman, third vice-president; John L. Tyndale, secretary-treasurer.

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RMEL

The program for Rocky Mountain Electrical League's 46th annual convention at the Stanley hotel in Estes Park, Colo., Sept. 11-14 is shaping up as one of the best in history, with unprecedented advance reservations, according to Ralph B. Hubbard, executive secretary.

Speakers of national stature have responded to invitations to address the convention, among them Nathaniel Leverone,, chairman of the board of directors of Automatic Canteen Co. of America, whose topic will be "Understanding." Others are: George Tenney, president and editor of ELECTRICAL WEST, San Francisco, whose subject will be "Government Power—Summarizing Power Resources of the West and Their Relation to Each Other;" J. J. Nance, president of Hotpoint Inc., Chicago, on "America, the Salesman's Market."

G. H. "Rock" Smith of the Deep Freeze Division, Motor Products Corp., Chicago, and C. Webb Theleen, national sales manager for the General Electric Co., Bridgeport, Conn., are also listed on the program though their subjects have not yet been chosen. Elmer L. Lindseth, president of the Cleveland Electric Illuminating Co. (new Edison Electric Institute president) will discuss "The Future of the Electrical Industry," on the final day. Appropriately enough, he will be followed by John E. Loiseau, president of Public Service Co. of Colorado, who will report on his recent trip to Washington, where he testified concerning the U.S. Bureau of Reclamation's plan to duplicate existing power and transmission lines as a measure to handle energy direct from Colorado River-Big Thompson project generating sources to market.

The first day (Sunday Sept. 11) will be devoted to registration and planning. During the succeeding convention period, business and speech-making sessions will be liberally laced by social and sports activities.

NECA

Ed Buttner, Scott-Buttner Electric Co., Oakland, and labor committee representative for District 6 NECA, was the official NECA representative at a convention of British Electrical Contractors Assn., June 20 to 28 in London. Faced with nationalization of power and the government entering into the field of electric equipment sales and contracting, the contractors have special problems. Buttner and T. L. Rosenberg also represented District 6 at NECA administrative committee meeting at Colorado Springs.

Colorado Springs was the setting for some important policy changing meeting of the National Electrical Contractors Assn., in June. First, on June 13, a gathering of the National Electrical Benefit Fund was held in Denver between Laurence W. Davis, secretary of the fund, and Rocky Mountain committees, in Denver. That same day and the next, the Line Constructors Section of NECA met at Colorado Springs to face some of the competitive labor and jurisdictional issues confronting electrical contractors in line construction work. Then June 15-17 the Administrative Committee consisting of the president and vice-president and chairmen of special activity sections of NECA met. Following this the labor relations committee held its meeting.

Both the administrative and labor relations meetings took cognizance of the protests from all over the country relative to recent actions of the Council for Industrial Relations for the Electrical Contracting Industry and revised the representation by setting up a larger panel from which to select a "jury" to hear various cases. The panel is to consist of 16 members, one selected by each district vice-president of NECA. It will be available at each council meeting and five members from it will be selected to hear each case. The membership may thus be drawn to have on it men, not themselves involved in that case, but with a familiarity with local conditions. It is also possible that managers of NECA chapters may be appointed to serve on the council. All of the union representatives are paid officials of the union and not journeymen electricians working at the trade.

These improvements were approved generally as steps toward making the council the impartial and representative judiciary body that was intended in its origin.

Formation of a Puget Sound Chapter of National Electrical Contractors Assn. which will assimilate the Seattle Electrical Contractors Assn. has been announced. Seattle will be headquarters for the new association and John B. Majerus, a field representative of NECA, has been named manager. Majerus, formerly with the Seattle Transit System, replaced R. D. Horning temporarily as manager of the Seattle Electrical Contractor's Assn. upon Horning's recent retirement. Now he will head the Puget Sound Chapter whose membership will include electrical contractors from the Canadian border to Chehalis and Centralia in Lewis County, the principal cities in this area being Bellingham, Mt. Vernon, Everett, Seattle, Tacoma and Olympia.

Horning, the retiring manager of the Seattle association, had held that post for 14 years. During that time he had been an outstanding worker in the Electric Club of Washington's ranks, having been a vice-president, member of the board of directors, chairman of the adequate wiring committee and lastly chairman of the legislative committee which came within an "ace" of securing passage of House Bill No. 56, a contractor's licensing law, long sought in Washington state.

Northern California Chapter, NECA, at its July 15 board of directors meeting in Oakland accomplished these things: Named William A. Goulart, Pioneer Electric Co., Richmond, president; increased minimum dues to $1 per month with the 1% of labor pay roll continuing as basic dues; affirmed Ernest Kramm as permanent manager and raised his and the office secretary's pay; approved the chapter's participation in a California-Nevada Line Constructors Chapter as recommended by the California Conference of NECA chapters at a July 9 meeting at Santa Barbara; released territory for formation of a chapter in Modesto and possibly another in Santa Clara, Santa Cruz area; set the next meeting for Oct. 20 at the Willows, Contra Costa County. Heard also reports as to status of labor negotiations in various branches of its area. The vacation-with-pay issue is up again and still unsettled in the Alameda and Contra Costa county areas and will go to the council again.

E. R. Cornish, NECA Pacific Coast office director, announced the formation of a new chapter, the Central Valley Chapter, with Robert Walker, Modesto, as manager. He introduced his new assistant, Bob Higgins. He told of settlement of a wild cat strike in Santa Barbara and Santa Maria through NECA effort. With pride and surprise he announced that the educational program, offering a correspondence course on estimating had brought enrollment of 200 contractors and a request from District 5 in Texas for aid in setting up a similar program.

Charles Sakumoto is the newly elected president of the Hawaii Electrical Contractors Assn. Serving with him will be Robert Kuniyuki, vice-president; M. McClaire, secretary; W. E. Garrison, executive secretary; T. Kanai, treasurer.

AIEE

Next year's convention of the American Institute of Electrical Engineers will be held at the Huntington, in Pasadena, June 13-16, 1950. This year's will be held in San Francisco Aug. 23-26.

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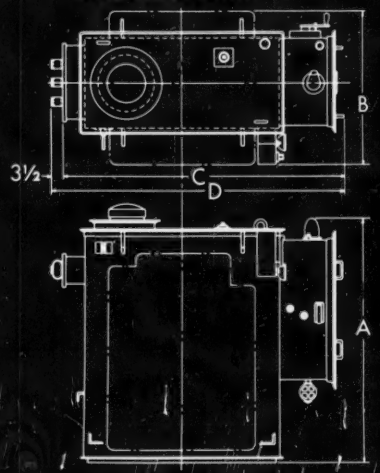

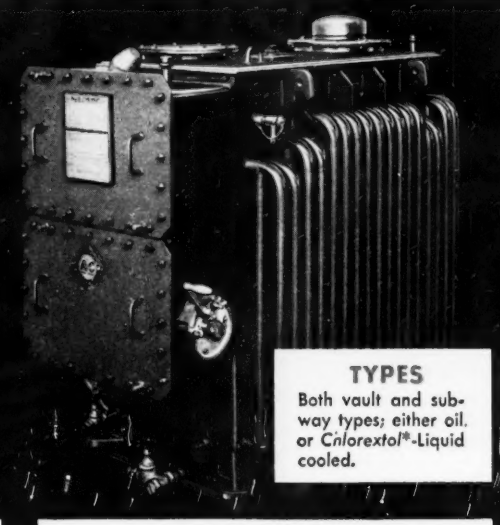

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500	65	40	74½	78	500	65	40	77½	81
750	76	42	80½	84	750	76	42	81½	85
1000	85	50	83½	87	1000	85	51	86½	90

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7200 v to 33,000 v — (4) 2½% taps below normal

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THE MONTH IN BRIEF

Government Competition Challenged

Constitutionality of federal government competition has been challenged by Public Service Co. of Colorado in federal district court. Before the court as party to a water rights dispute for which the USBR seeks adjudication, the power company has raised the competition issue, long a moot point. Hitherto, industry attempts to secure such a test have been blocked by court refusal to entertain a suit to stop federal competition. Now the government itself has provided a loophole, and Colorado Public Service has tied in the water dispute with the bureau's proposed Colorado-Big Thompson transmission line network.

Competition Case Hinges on Document 80

The case hinges on interpretation of Senate Document 80 of the 75th Congress, authorizing construction of the Colorado-Big Thompson project. The government's water rights suit is based on this document, which rules on diversion of water from Colorado-Big Thompson reservoirs. The power company contends that the bureau's proposed transmission lines would violate limitations established by the document. Document 80, Public Service points out, limited all electric transmission lines to 192 circuit miles at an estimated cost of $2,181,000; specified that 54 miles were to connect federal hydro plants to the company's Valmont plant at Boulder, that the remainder was to connect the several government generating plants.

Public Service Asks Interpretation

Public Service specifically asked the court to (1) adjudge the extent to which the bureau is limited by Document 80 in building transmission lines; (2) restrain the bureau from building duplicating lines. Both the power company and the bureau have claimed that the document has the "force and effect of law." The company claims that its right to flow of 1,250 cu. ft. per second at Shoshone Dam on the Colorado has been established in the state courts, giving it full protection under provisions of the document.

Cooperation Already Offered

Public Service of Colorado earlier offered to "wheel" power from the Colorado-Big Thompson plant to avoid duplication and to cooperate with the bureau in other ways in marketing the power (EWEST, June, p. 132).

Compromise on Colorado

Compromise legislation was introduced by the Senate Interior Committee in the California-Arizona dispute over Colorado River water. The committee bill would (1) authorize the $738 million multiple-purpose Central Arizona project for construction by USBR but (2) delay work on irrigation features pending settlement by the Supreme Court of the water controversy. Net result would be to permit immediate construction of Bridge Canyon Dam and its 750,000-kw. hydro generating plant. And the 25-year-old water fight would go to the Supreme Court. Action of the Senate committee came only after weeks of wrangling, and was taken over protest of California's Senator Downey. California opposed the Central Arizona project because it would use water claimed by the state. Arizona wanted the entire CAP without strings; claimed legal title to the irrigation water, argued litigation would delay needed development.

Counties Cannot Sell Power

A bill to allow counties to develop and sell hydro power was defeated in the California state courts, after it had passed the assembly. Senators argued the bill would allow counties to sell power to private companies; would waste water and power resources rather than save them.

PUD to Generate Power

Snohomish County PUD of Everett, Wash., which has made a bid for Puget Sound Power & Light properties in its district (EWEST, July, p. 118), last month voted to proceed with development of the Sultan River. It will construct two dams, with capacity of 150,000 kw. Preliminary work on the $14,000,000 project is expected to start this year.

Strike Cuts Appliance Sales

After two months of dock strike, Honolulu appliance dealers reported sales off 40% in many instances; 90% in some cases. The slow-down basically was not caused by shortages but "strike psychology," it was stated.

Utility Gets Franchise

Rocky Ford, Colo., granted a 25-year franchise to Southern Colorado Power Co. after a local tussle between the advocates of municipal ownership and the community at large. The PTA was one of the staunchest advocates of business-managed operation and helped to swing a deadlocked city council.

Final Unit in at Harbor Plant

Fifth and final unit of the Los Angeles Department of Water and Power's Harbor Steam Plant at Long Beach, a 75,000-kw. 1,800-r.p.m. turbine, went into service July 6, bringing the plant's capacity to 355,000 kw. Work on the $42,000,000 plant was begun early in 1941. The first unit, of 65,000-kw. capacity, was put on the line in 1943.

Co-op Purchase Completed

Idaho Power Co. has purchased the Malheur Cooperative Electric Assn., Vale, Ore., for some $473,000 (E. WEST, June, p. 132). The system includes about 400 miles of line serving 640 customers in Malheur and Baker counties in eastern Oregon and in Payette County, Idaho.

"The effect of the temperature on the operation of thermally-controlled circuit-breakers should be taken into consideration in the application of such circuit-breakers when they are subjected to extremely low or extremely high temperatures."

(From the 1947 National Electric Code book, page 52)

Circuit Breaker "Derating" Advised by the Code

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Murray FULLY MAGNETIC Circuit Breakers

Have NO Thermal Element... Are NOT Affected by Heat... NEVER Need "Derating"

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. . . heat builds up, often trips thermal circuit breakers far below rated load. But Murray Fully Magnetic Breakers have no thermal element, are not affected by heat.

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Inverse time delay is achieved in Murray Fully Magnetic Circuit Breakers by a simple, hermetically sealed, factory calibrated hydraulic piston. No "derating" is ever needed!

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1. A 15 amp. Murray Fully Magnetic breaker on No. 14 wires, or
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THIS MONTH'S NEWS

Landowners File Suit on Use of San Joaquin Water

Fifteen landowners in the Mendota area in California's Central Valley have filed suit in the U. S. District Court in Washington, D. C., to enjoin the government from alleged illegal use of San Joaquin River water.

The group complains that the Bureau of Reclamation is selling river water at rates lower than those provided by law; taking water away from riparian owners without making an attempt to repay them, and taking water illegally out of the San Joaquin River watershed.

The suit charges that riparian rights are violated—that the bureau is taking the water to lands having no riparian rights, owned principally by oil and railway companies. It also accuses the bureau of selling water at rates ranging from $1.50 to $3 an acre-ft., although it costs the government many times that amount.

The bureau's Central Valley project dams the San Joaquin River at Friant Dam, diverting part of its flow into the Friant-Kern Canal. Concurrent with the filing of the suit, Sacramento River water flowed for the first time into the Delta-Mendota Canal, a canal that, on its completion, will replace waters diverted from the Mendota area.

Another injunction suit filed a few days later in Los Angeles federal court sought to restrain the bureau from releasing less than 350 sec. ft. of water from Friant Dam. A group of northern California fishing interests contended that both commercial and sport fishing was threatened because water control blocks spawning.

● An Alcoa engineering party will go to Skagway, Alaska, to continue investigations for establishment of a $300,000,000 metallurgical industry in that area, the Alaska Development Board has announced at Juneau. Dr. Warren J. Mead, head of the geology department at M.I.T., will head the party. Alcoa plans are reported to call for development of a large block of low-cost power by diverting headwaters of the Yukon River to the Skagway area.

● FPC has authorized Telluride Power Co., Salt Lake City, to issue $300,000 in 6% cumulative preferred stock, with a total of 3,000 shares to be offered at $100 par value.

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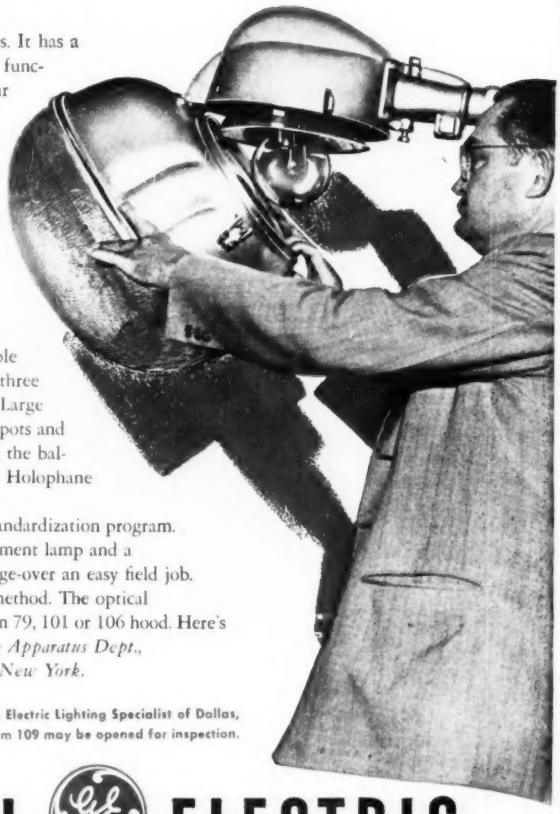
For 15,000 Lumen Lamps here's the most effective Luminaire ever built

It's the new Form 109 using filament lamps. It has a distinctly modern appearance, with clean functional lines. By day it calls attention to your street lights. By night it increases safety on your streets.

And it brings a new effectiveness to street lighting. The long-sought rectangular roadway light pattern is now a reality with the Form 109. The secret lies in an exclusive G-E ovate reflector which starts the light in the right direction.

And it's safer because there is less glare than with any other luminaire of comparable lumen output. The Form 109 reduces glare three ways—(1) Deep-shielded light source, (2) Large low-intensity refractor which has no "hot" spots and (3) Extremely accurate control of light by the balanced operation of the ovate reflector and Holophane verti-lateral refractor.

And the Form 109 will fit in with your standardization program. It will burn any 7" or 9½" light-center filament lamp and a complete line of mercury lamps—with change-over an easy field job. It's available with any standard mounting method. The optical assembly can be adapted to any existing Form 79, 101 or 106 hood. Here's a luminaire you want to know about. Write *Apparatus Dept., General Electric Company, Schenectady 5, New York.*



Mr. G. C. Buchanan, General Electric Lighting Specialist of Dallas, Texas, shows how easily the Form 109 may be opened for inspection.

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ELECTRICAL FITTINGS

TRINIDAD MUNICIPAL STARTS POWER PLANT CONSTRUCTION

Construction has been started on the new Trinidad, Colo., municipal power plant, destined eventually to produce 9,000 kw. of electrical energy for residential consumers in the 12,000-population community.

The building, designed by the Rocky Mountain Engineering Co. of Denver, will house three 3,000-kw. steam generating units, the first of which is expected to be on the line Jan. 15, 1950, and the second a month later. Installation of the third unit will depend on demand.

This enterprise stems from a bitterly fought election last year when Trinidad voters ousted the Frontier Power Co. by an eight to one margin, authorized issuance of $1,300,000 revenue bonds to purchase private utility's local distribution system and erect its own generating plant.

Building operations now under way are estimated to cost approximately $1,250,000. Equipment will consist of two Westinghouse turbine generators and two 45,000-lb. Combustion Engineering Co. boilers. Contracts have been let to the Continental Construction Co., Denver, for erection of the brick, steel and concrete building and L. M. Marcum, Marshall, Mo., for installation of mechanical facilities and machinery.

At present, the community is buying its energy from the Frontier company, distributing it via the lines bought from Fontier for $325,000 and rehabilitated at a cost of $100,000. Trinided expects to be electrically self-sufficient not later than March 1, 1950.

Edison Given Fifty Year License for Hydro Plant

Southern California Edison Co. has a 50-year license from FPC for a 115,000-hp. hydro project on the San Joaquin River in central California. Estimated cost of the development is $19,400,500.

The company will build a 228-ft. arch-type concrete dam with a crest length of approximately 954 ft. A 5¼-mile reservoir will have a 35,000-acre-ft. storage capacity. The power house will contain two 57,500-hp. hydraulic turbines, each connected to a 42,000-kva. generator.

The new development will be located between Edison's Big Creek power house No. 3 and PG and E's Kerckhoff plant.

● Before permission is given Northwest Power Supply Co. to build the $12,000,000 Pelton Dam on the Deschutes River in Oregon, approval must be secured from the State Fish Commission, the Oregon Hydroelectric Commission has ruled. If the fish commission is satisfied that the hatchery planned by the company is sufficient to maintain fish life, then the hydro commission would consider a temporary license, it said. The proposed dam would be 150 ft. high, too high for fish ladders. The fish commission has opposed the project.

Seattle Engineer Proposes Steam to Supplement Hydro

A proposal that steam-generating plants be built in western Washington to supplement hydroelectric power has been advanced by James I. Metcalf, Seattle consulting engineer, who was formerly associated with the Bonneville Power Administration engineering staff.

Metcalf proposed immediate installation of plants in the Seattle, Tacoma, Longview, Anacortes and Grays Harbar districts, capable of developing 500,000 kw. at an estimated cost of $78,000,000. Later, he said, steam plants should be installed to provide a total capacity of 1,000,000 kw.

A similar suggestion was made recently by Governor Arthur B. Langlie, who said the state's unused coal reserve should be developed as fuel.

Metcalf's financial analysis, however, was based on the use of fuel oil. He declared greater savings may be possible when natural gas becomes available. In a presentation prepared for the Tacoma Engineers' Club, Metcalf estimated the cost of a high-pressure steam plant at $156 a kilowatt. He pointed out that steam could never be competitive with hydro installations in the Pacific Northwest, citing steam costs of 6½ to 7½ mills a kilowatt-hour, as compared with the 2-mill basic Bonneville rate.

His analysis showed that a steam installation, combined with federal primary power, would provide additional firm power at 4.6 mills, on a 50% load factor.

● Seattle City engineer Ralph W. Finke has asked the city council for authority to hire 47 electrical and clerical employees to work on Seattle's $4,000,000 street lighting program. Part of the program will be under private contract, but the city will do some of the work, he said.

● A Second 56,000-kw. generator at Montana Power Co.'s Kerr hydro plant was put in operation recently. It brings plant output up to 112,000 kw., and installed capacity to 500,000 kw.

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WE have made—and quit making—a lot of things during our nearly 100 years in business. Because of our "know-how" in making insulation of unusual durability, we were asked to develop rubber-covered cannon balls to reduce wear-and-tear on cannon, during the war between the states.

It was an interesting job—but the solution to cannon wear was tougher cannon rather than softer cannon balls.

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CENTRAL ARIZONA COMPANY CUTS IN STEAM PLANT

Generating capacity of the Central Arizona Light and Power Co. steam plant at Phoenix has been stepped up to 85,500 kw. with addition of a 11,500-kw. unit. Cutting in of the new unit marked the second phase of a $13,500,000 program started in September 1949.

The company's production still is short of demand. On the day the new unit went onto the line, customer demand was 124,110 kw.—a new summer peak.

A sixth generating unit, of 66,000-kw. capacity, will be in service by May 1950. It will cost $8,500,000, including power house expansion and boiler.

The small generator just installed was the only one available in time to help cut the summertime load. Installation was rushed with double crews in order to have it ready for peak demands.

USBR Fort Peck Rate Schedule Approved by Power Commission

The Federal Power Commission has approved USBR's proposed rate schedule for sale of electric energy to customers of the Fort Peck project in Montana, served from Montana-Dakota Utilities Co.'s eastern system.

Applicable to wholesale power customers supplied through one meter at one point of delivery, the schedule will remain in effect until Dec. 31, 1955, or until electric power is available for commercial sale from the Garrison Dam project, under construction by Army Engineers on the Missouri, downstream from Fort Peck.

The schedule consists of a basic rate identical to the existing firm power rate for direct service from the Fort Peck project, plus an energy surcharge.

Newly Designed Condenser to be Installed at Bonneville Sub

Contract for construction of a newly designed 50,000-kva. synchronous condenser to be installed at the Goshen, Ore., substation of the Bonneville Power Administration has been awarded to the Elliott Co. of Geanette, Pa., on a bid of $509,832.

Changes in design will permit the condenser, one of the largest ever built, to carry a 200% load up to 10 seconds, and correct voltages during system disturbances much faster than standard types.

Orem steam plant addition of Utah Power & Light Co. at Salt Lake will house a new 40,000-kw. unit. Completion is scheduled for August of 1950

● UTAH POWER & LIGHT Co. has retained Bechtel Corp. of San Francisco to engineer and supervise construction of a 60,000-kw. steam-electric unit, first of an eventual three-unit station in Salt Lake City. Construction will start this summer, with completion scheduled for 1951.

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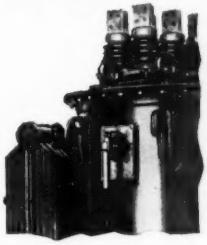
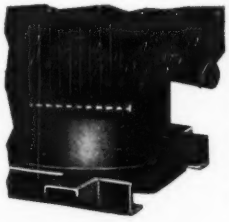
STRONG, PROTECTED RADIATORS

Radiator fins are grooved for added rigidity...bonderized for added protection against rust. Staggered fin construction simplifies repainting.



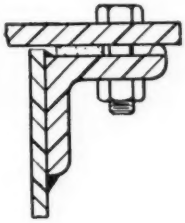
SIDE OPERATED TAP CHANGER

Easily accessible and readily observed no-load tap changer operating handle is located on side of transformer tank. Operating mechanism is simple, clean cut in design.



RIGIDLY BRACED BASE

Modern fabricated base permits rolling in all directions. Convenient jacking pockets are designed for use with all standard lifting devices. Provisions in base facilitate grounding.



CONTROLLED GASKET COMPRESSION

Gas and oil leakage is eliminated at every gasketed joint. Controlled gasket compression insures oil-tight seal...prevents injury to gasket through over-compression.

. . IN YOUR NEXT SUBSTATION TRANSFORMER!

LOOK AGAIN AT the features above! They add up to easier installation . . . less maintenance . . . lower cost operation! They're *extra-quality* features found in *all ratings* of Allis-Chalmers power transformers.

ALSO IMPORTANT ARE . . .

a number of "unseen" quality improvements recently made possible through new and improved methods of construction. They include closer control of electrical core steel characteristics and extended use of bonderized surface protection—added steps toward bringing you the *best* in power transformer performance.

Want more information on Allis-Chalmers bonus-built transformers? Call your nearby A-C sales representative today. Or write direct. A 2752

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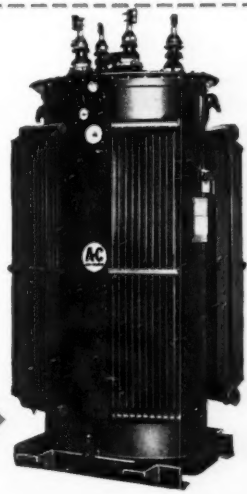

ALLIS-CHALMERS

First trolley coach to operate on San Francisco's Market Street, this is one of 190 coaches that went into service last month. It is driven by a 140-hp. Westinghouse series motor and equipped with Electrocam control. Dynamic braking on grades up to 19% enables the coaches to run on the San Francisco hills normally used for transportation routes

BIDS CALLED FOR POWER FACILITIES AT AIR BASE

Bids for installation of permanent power facilities for GCA at the Fairfield-Suisun Air Force Base in northern California have been called by the U. S. Engineers in San Francisco.

The base will be one of the first in the country to have permanent power for a ground-controlled approach system. The present system uses portable power generators housed in mobile trailers. The permanent feature will add safety margins to blind landings by precluding failures of the portable generators. The power trailers will be maintained as an emergency auxiliary source.

● A 16-mm. COLOR AND SOUND film, *The Hidden World*, has been produced by Allis-Chalmers to depict the engineer's contribution to better living conditions and a more enjoyable life. Running time is 26 minutes. Prints are available for engineering groups upon request to Allis-Chalmers Mfg. Co., advertising and industrial press department, General Machinery division, Milwaukee 1, Wis.

● THE NEW MEXICO Public Service Commission has approved the sale of the Grants district of the Inland Utilities Co. to the recently formed Continental Divide Electric Co-operative Co. Price was given as $715,000.

Cofferdam Contract Let for McNary Dam on Columbia

Submitting a joint bid of $15,835,539, the Guy F. Atkinson Co., Ostrander Construction Co. and the J. A. Jones Construction Co. are low bidders for the construction of the Oregon shore cofferdams and a portion of the power house at McNary Dam on the Columbia River between eastern Washington and Oregon.

To expedite delivery of new power into the Pacific Northwest, the contract calls for construction this fall of a "junior" cofferdam that encloses the site of the power house service and assembly bays as well as the site for the first two main generating units. As soon as the junior cofferdam is completed, probably late this year, work can begin on the power house.

Construction of this cofferdam will permit placing the first generating unit in service almost a year earlier than previously scheduled, by Dec. 1, 1953.

The three contractors presently are engaged in construction of the Washington shore installations, including the navigation lock, fishways and 13½ bays of the spillway dam, under a $21,784,456 contract.

● BIDS will be opened Aug. 26 by the Portland district, Corps of Engineers, on furnishing, installing and testing two 55,555-kva. alternating-current generators and appurtenances for the Detroit Dam, under construction on the North Santiam River in western Oregon. The two generators will cost in the neighborhood of $2,000,000.

This 7,500-kw. steam turbine generator went on the line recently at the Tempe plant of the Salt River Valley Water Users Assn. (EWest, July, p. 123). The G-E unit cost $850,000; is expected to pay for itself in about three years. It is the fourth such unit installed at the plant

ROCKBESTOS ANNOUNCES

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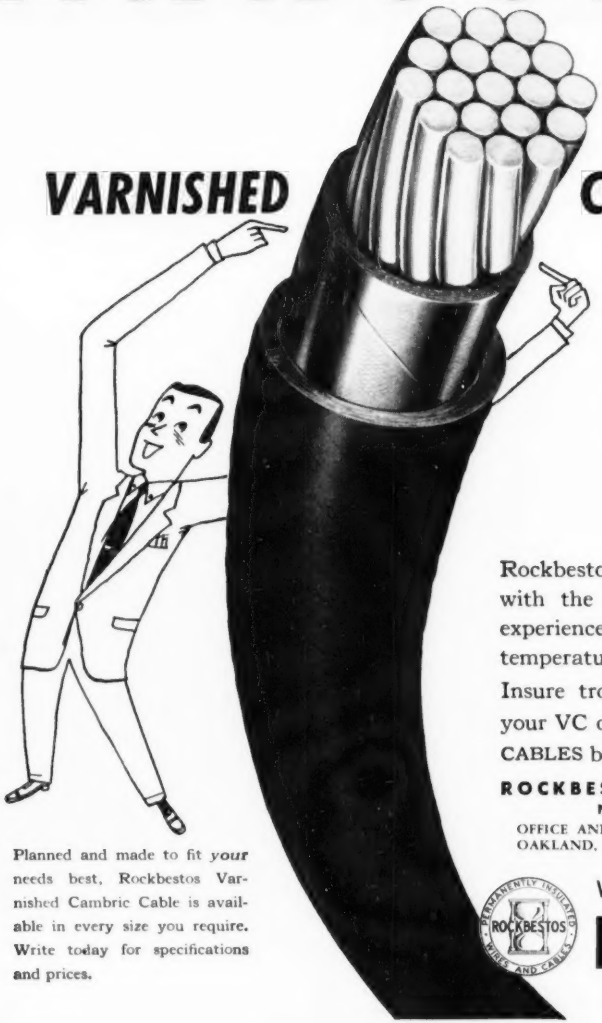

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Rockbestos VC cables are manufactured by men with the "know-how" gained from 23 years experience with varnished cambric tapes for high temperature operation on AVC cables.

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OFFICE AND WAREHOUSE, OAKLAND MUNICIPAL AIRPORT, OAKLAND, CAL.; LOS ANGELES DISTRICT OFFICE, 6919 SAN FERNANDO RD., GLENDALE, CAL.

Planned and made to fit *your* needs best, Rockbestos Varnished Cambric Cable is available in every size you require. Write today for specifications and prices.

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NOTES ON THE TRADE

● A. B. SMEDLEY has been named to head the cold cathode division of the Sunbeam Lighting Co. of Los Angeles. Smedley, former Anaconda Wire & Cable Co. man, lately representing a line of cold cathode equipment no longer available, is familiar with all phases of this type of lighting. Sunbeam has announced an industrial, a troffer-type, a louvered commercial, two types with open tubes, and cold-cathode-channel units in the cold cathode end of its line.

● GREGORY ELECTRIC CO., Chicago, has announced that it will move its transformer manufacturing business to San Diego. The company had purchased a building there about a year ago. Tools and other machinery will be shipped from Chicago. Production was scheduled to start before July 15, according to Joseph Pass, chairman of the board. Only four employees will be transferred. About 300 persons will be employed in San Diego by the time full operations are reached.

● OSCAR C. PALMER, owner-president of Palmer Mfg. Corp., Phoenix, recently announced that his company has purchased the Pacific and Superior heating divisions of Naco Mfg. Corp., Los Angeles, a subsidiary of the Grace Steamship Lines. Palmer heating equipment will now be manufactured under the trade-marks Pacific, Superior and Palmaire.

● BEN FRANKLIN of Franklin Sales Co., Denver, and J. C. Platt of Seattle, both agents for Southern States Equipment Corp., attended the first annual sales conference of Southern States Equipment Corp. in Hampton, Ga., recently.

● R. H. FISHER CO., San Francisco manufacturers' agents for electrical products, has been appointed exclusive northern California and Nevada representative for products made by the O. Z. Electrical Mfg. Co. of Brooklyn.

● WARD LEONARD ELECTRIC CO., Mt. Vernon, N. Y., has announced the appointment of Central Station Engineering Co., Tucson, as its sales representatives in the state of Arizona.

● ELECTRICAL SPECIALTY CO., with home offices in San Francisco, has taken on distribution of Safe-T-Mike capacitors, made by Safe-T-Mike Condenser Co., Oakland.

● ADMIRAL CORP. has announced the establishment of Seattle Distributing Division, 558 First Ave. S., Seattle, to distribute Admiral radio, radio-phonograph, television sets, electric ranges and refrigerators in that area. C. W. Strawn, former vice-president of RCA Victor Distributor Corp., and more recently manager of the appliance division for Admiral, will head the newly established division. Other officers are Keith Davis, sales manager, who was formerly associated with Connelly Co., Seattle; and R. W. Biggs, sales promotional director.

● FOLLOWING the announcement that J. H. Wendt, district credit manager in San Francisco for Graybar Electric Co., has been transferred to the same position in the New York district, it was reported that A. G. Faul will take on duties as credit manager in San Francisco. Faul's district includes branch houses at Sacramento, Fresno, Oakland, Salt Lake City and Boise.

● CRESCENT ELECTRIC SUPPLY CO., wholesale distributor of San Francisco and Santa Rosa, has taken on distribution of General Electric wiring devices in northern California, southern Oregon and Reno. Crescent representatives will utilize a fleet of walk-in one ton International trucks in distributing the various G-E products at the time of sale.

● CONTRACT to build ten tractor gates for the Garrison Dam in North Dakota has been awarded to the Sunnyvale, Calif., plant of Westinghouse. Over-all dimensions of each gate unit will be 15x30x3 ft. With attachments, each one will weigh nearly 116,000 lb.

● DEEPFREEZE Division, Motor Products Corp., has appointed J. E. Redmond Supply Co., Phoenix, as distributors of Deepfreeze home freezers in that area.

● WARD LEONARD ELECTRIC CO., with headquarters at Mt. Vernon, N. Y., has established a Los Angeles branch office and warehouse at 420 S. San Pedro St. The new branch is headed by H. S. Eales, district manager.

● SMITTY'S ELECTRONICS, Butte, Mont., is a new distributor for the radio division of Sylvania Electric Products Inc., according to H. H. Rainier, manager of distributor sales.

● THOMAS & BETTS CO. has moved from 103 N. Santa Fe, to 459 E. 4th St., Los Angeles.

● PACIFIC ELECTRIC MOTOR CO. has moved into its new location at 1009 66th Ave., Oakland 3.

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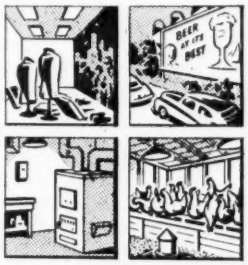
Tork Clock Time Switches are world renowned for their dependability and accuracy. They require no regular attention, and are available in many electrical capacities for both indoor and outdoor use.



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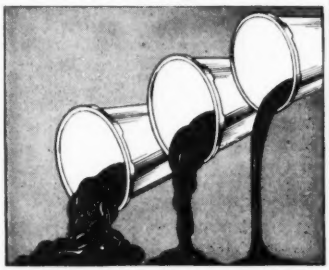
Insulating and Cable-Pulling
COMPOUNDS
of Record-Breaking Performance



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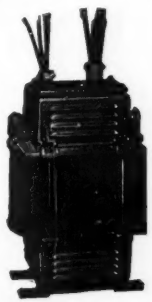

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Specify scattered transformers to eliminate duplicate conduit runs and save on power costs.

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NEWS ABOUT PEOPLE

● WALTER L. STICKEL, manager of the RCA-Victor division of the Leo J. Meyberg Co., Los Angeles, has moved to the East Coast to take over the position of national sales manager for Du Mont Television, New York. Well-known on the West Coast as a past president of the Electric Club of Los Angeles, and founder and past director of the Southern California Electrical Appliance Assn., Stickel started his career in 1933 as assistant to the advertising and sales promotion manager of the Los Angeles Bureau of Power & Light. In 1937 he took a job with the Electrical Development League of Southern California. Three years later he joined the Meyberg Co. as manager of the sales promotion and advertising department.

● ELBERT KRAMER, district appliance sales promotion manager for Westinghouse Electric Supply Co. at Los Angeles, has been appointed southern California district sales promotion manager for the company, headquartered at the Los Angeles office. Kramer was formerly with Westinghouse appliance division in San Francisco. In 1947 he was transferred to WESCO as an appliance salesman in the Los Angeles office. In March of this year he was made district appliance sales promotion manager and held that position until his recent appointment.

● ORA F. METZ, district manager of the El Paso and Phoenix offices of Allis-Chalmers, retired on July 1 after nearly 43 years with the company. With his retirement El Paso has become a branch office under Phoenix, with John E. Despins as manager. W. C. Kinnon, who was manager of the Phoenix branch office, will continue as manager of the new district office.

● L. M. ROBERTSON, assistant superintendent of the hydroelectric production and transmission department of Public Service Co. of Colorado, has been elected president of the Colorado Engineering Council. He has served for the past two years as vice-president of the council.

● RALPH E. GALE, general sales manager of Idaho Power Co. since 1936, has become assistant to the president. In his new position he will continue to supervise the company's sales and industrial promotion in addition to new administrative responsibilities.

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INSULATORS

For long life and quiet operation choose Thomas "Q-T" insulators. There's one for every operating voltage.

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Electrical technician, 47, 2 years college, ICS Elec. Engr. Course, 25 years' experience elec. field with industries, utilities and construction as electrician, Ch. Elec., Gen. For., buyer, estimator, contractor, sales and service with Allis-Chalmers and Westinghouse, wants position in the West in a mild climate with an industry, utility or large appliance store as supervisor, maintenance engr., estimator, buyer, dealer sales, write—Electrical West, Box 255, 68 Post St., San Francisco 4, Calif.

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Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
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THE 17th ANNUAL MANUFACTURERS' DIRECTORY published April 1949 by ELECTRICAL WEST, is a handy guide listing manufacturers of electrical equipment, and their principal Western sales outlets.

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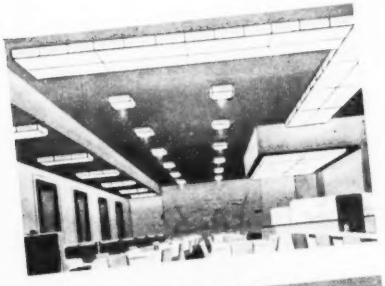
REG U S PAT OFFICE



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Attention:.....

Californians pictured at the summer meeting of the American Institute of American Engineers at Swampscott, Mass.

● CLEO E. THOMAS, assistant treasurer and credit manager of California Electric Power Co., has taken over the duties of traveling auditor for the company. B. STOKER, right-of-way agent, has been appointed to succeed Thomas as credit manager. At the same time the utility announced that W. S. FLEMING has taken on executive duties as special agent in the executive department.

● BILL KAISER has been appointed manager in the East Bay area for Zinsco Electrical Products Inc., with headquarters at Oakland. He replaces Jimmy Land. Kaiser was formerly manager of the southern California territory for the company. At the same time the company announced that Roy Stanley has been named engineer in the Oakland offices.

● E. J. PAAR, formerly in charge of appliance sales in the San Bernardino area for California Electric Power Co. of Riverside, has been promoted to commercial representative for that area. He will serve as assistant to Robert Neuman, district manager.

● R. W. PATRICK has been promoted to the position of dealer services supervisor for B. C. Electric Railway Co., Victoria. He succeeds W. E. HOLLAND, who has been advanced to gas sales engineer for the company at Vancouver.

● ROY MARTINDALE retired recently as assistant chief electrical engineer of the Los Angeles Department of Water & Power. He had been with the department for more than 37 years, beginning in 1911 as a draftsman.

● DR. DONALD L. BENEDICT of Cambridge, Mass., has taken over duties as assistant chairman of the department of electrical engineering at Stanford Research Institute. He will assist in the supervision of research personnel engaged in electronics projects.

● MILTON G. SANDERS has joined the Leo J. Meyberg Co. as assistant to the president, Al Meyer. Sanders was former commercial vice-president of the Central Arizona Electric Light & Power Co., Phoenix, until late last year when he joined Bob Bale, personnel and sales lecturer, as the latter's manager. He will make his headquarters at the San Francisco office of the Meyberg Co.

● WESTINGHOUSE ELECTRIC Corp. has appointed Wilbur A. Howe of Berkeley as manager of engineering and service for the Pacific Coast district. He succeeds A. W. Copley of Palo Alto who retired recently after 46 years of service with the company. Since 1944 Howe has served as assistant manager of engineering and service for the district. He has been with Westinghouse since 1926.

● J. R. SULLIVAN has been elected treasurer of Montana Power Co., succeeding J. R. THOMAS, who recently retired. Sullivan has been with the utility for 33 years, serving since 1940 as assistant treasurer. HARRY C. DONALDSON, formerly chief accountant, was elected to fill the position of assistant treasurer.

● GARLAN MORSE has become director of sales on the Pacific Coast for Sylvania Electric Products, replacing GEORGE R. SOMMERS who was recently transferred to the company's home office as assistant to the general sales manager, radio tube division. Morse was formerly general merchandise manager of Sylvania's lamp division.

● PUBLIC SERVICE Co. of Colorado has appointed L. R. PATTERSON superintendent of electric system planning. He joined the company in 1923 as a draftsman in the electric distribution engineering department. At the time of his appointment he was staff engineer of electric operations.

Deaths

● FRED W. BROWNELL, 65, retired treasurer of Puget Sound Power & Light Co., died on July 9 in Seattle from a heart ailment. A veteran of 41 years in the power industry, he joined Puget Sound Power & Light as controller in 1919 and later became treasurer, holding that position until his retirement in 1947. Mr. Brownell had recently been made an honorary life member of the Northwest Electric Light & Power Assn.

● RICHARD J. THOMAS, 72, former chief engineer of Hawaiian Electric Co., died on June 6 in Burlingame, Calif. He retired in 1940. Before joining Hawaiian Electric in 1920 he was with the Great Western Power Co. of San Francisco as chief engineer of the Beach and Mason plant, now part of Pacific Gas and Electric Co.

● ALBERT E. GARLAND, retired electrical engineer, died at his home in Berkeley, Calif., recently. He had been suffering from a heart ailment since January, when he retired from the Garland - Affolter Engineering Corp., San Francisco, of which he was co-founder 34 years ago.

● HERBERT ZENKER, 54, district sales manager for Magnavox Co. in southern California, died of a heart attack in Los Angeles recently. He had represented the company in the Los Angeles area since joining the organization 12 years ago.

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are *Standardized*

to meet your requirements

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Single-phase
3 kva.

Wagner's complete line of distribution transformers includes every rating and design listed in the E. E. I.-NEMA Fourth Report! This means that you get the benefit of the improved design, quality construction and high efficiency of Wagner Transformers with *standardized* mechanical features in ratings of 500 kva and below—15,000 volts and below.

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Single-phase
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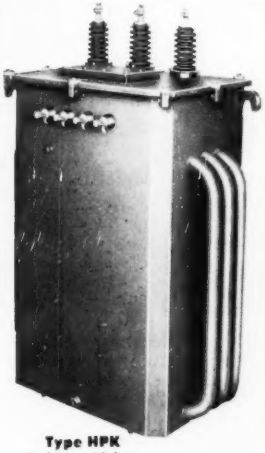
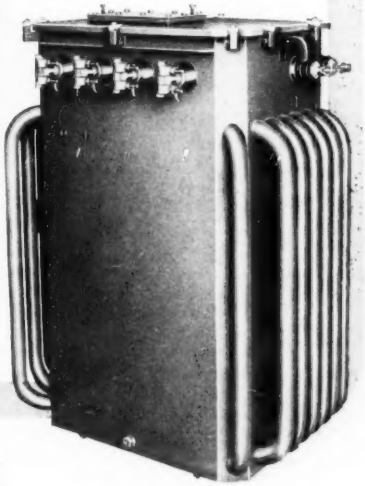


Type HPK
3 phase—45 kva.



Type HPB
3 phase—112½ kva.

Wagner has a nationwide organization to provide fast, convenient service, with 29 branches located in principal cities ready to help you with your transformer problems. Bulletins TU-180 and TU-181 give complete information on Wagner Transformers.

T49-9

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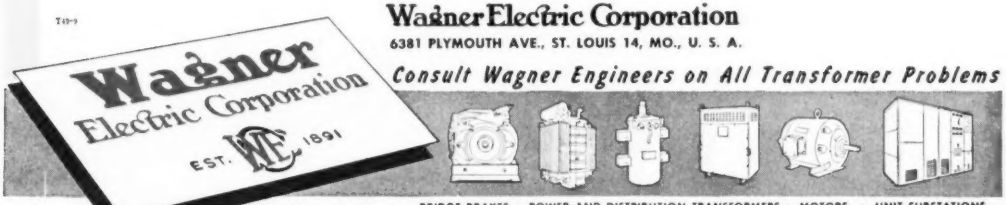

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ELECTRICAL EQUIPMENT AND AUTOMOTIVE BRAKE PRODUCTS

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PROFILES

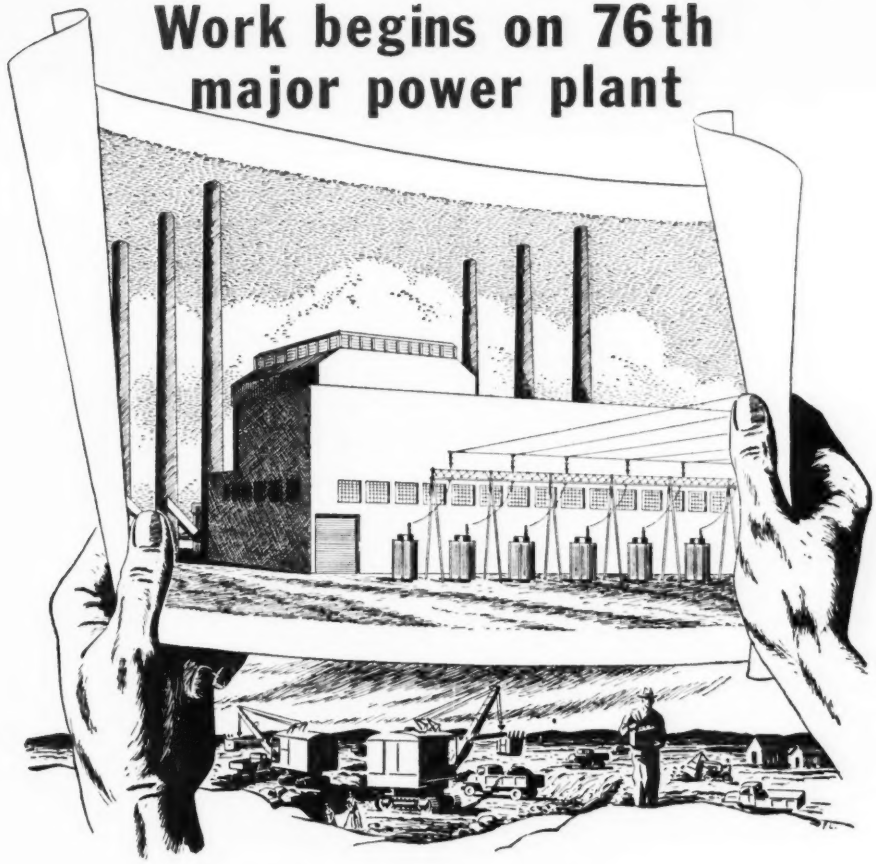
H. Colby Burns, author of the series on plant maintenance running in Electrical West, (left) and C. G. Rumohr, both Public Service of Colo. engineers

Wilbur A. Howe, left, new manager of the Westinghouse engineering service department, Pacific Coast district, and A. W. Copley, retiring manager. Copley is wearing camera which his associates gave him on his retirement

Above, J. F. McAllister, UP&L, was elected president of the Intermountain Electrical Assn., succeeding Stanley Johns, transferred by Westinghouse to Los Angeles. At right, Garlan Morse, Pacific Coast sales director for Sylvania. He succeeds George R. Sommers

New officers of the Utah Chapter, International Association of Electrical Inspectors, Salt Lake City, left to right: Leonard Mitchell, secretary-treasurer; L. John Christensen, chairman, and Kenneth Williams, second vice-chairman

Work begins on 76th major power plant



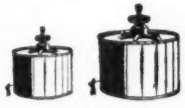
One of the largest powerhouses ever built in California is now underway—Contra Costa Steam Plant. When completed, it will become P. G. and E.'s 76th major plant —will create 402,000 new electrical horsepower. That's enough energy to supply Oakland, Stockton, Richmond, Tracy, Emeryville and South San Francisco. It will include three mammoth generators, fuel oil storage tanks, switch yards and boilers tall as eight-story buildings.

Good jobs will go to about 1,500 workmen. Wages will account for much of the project's $51,500,00 construction costs. A large share of these wages will flow to local businesses.

Schools, too, are a principal beneficiary wherever P. G. and E. builds plants because of the increased taxes the Company pays in the communities where our properties are located.

for the record

When Contra Costa plant is completed in 1951, P.G. and E. will have doubled its prewar electrical output . . .



. . . from 2,000,000 to 4,000,000 horsepower.

This is America's greatest power-building program.

P · G · and E · PACIFIC GAS AND ELECTRIC COMPANY

EW 108-849

Electrical Living Campaign Reveals Preference List of Appliances that California Homemakers Want to Buy Next

From nearly 9000 completed entries mailed to the Bureau office in the "Step Ahead with Electrical Living" Campaign, contestants revealed very decisively what appliance or electrical convenience they next wanted in their homes.

It was interesting to note that the contestants doubled their first choice, wanting both a washer and a home freezer as their next appliance buys.

Here is the complete tabulation of the appliances wanted as "Next to Buy."

2584 wanted a new washer
2551 wanted a home freezer
2180 wanted a television set
2173 wanted an electric range
2153 wanted a new refrigerator
1458 wanted a new radio
1262 wanted an electric dishwasher
1079 wanted a clothes dryer
963 wanted an electric water heater
930 wanted an electric garbage disposer
917 wanted new and better lighting
915 wanted more complete and adequate wiring

Appliance dealers can well use this "buyers' guide as a selling guide and that means getting out, ringing doorbells and doing old fashioned doorstep selling.

Northern California Electrical Bureau

1355 MARKET STREET, SAN FRANCISCO